RAILROAD GAZETTE

FRIDAY, MARCH 30.

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Contributions.

Wind Pressure and Velocity.

PHILADELPHIA, Feb. 24, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I beg to call your attention to the very close agreement between the results of Sir Henry Bessemer's experiments on wind pressure, as given in the *Railroad Gazette* of 10th inst., and the formula in common use:

Pressure in lbs. per sq. ft. = square of velocity in miles per hour ÷ 200 = .005 square of velocity in miles per hour, upon which Smeaton's well-known table is based. The figures are as follows:

Velocity in miles per hour.	Pressure in lbs. per sq. ft.			
	By experiment.	By formula $p = .005\ v^2$	Difference.	Per cent. of difference.
20	2.1	2.0	−0.1	−5
25	3.2	3.125	−0.075	−2.3
30	4.5	4.5	0.0	0
35	6.1	6.125	0.025	0.4
45	10.0	10.125	0.125	1.25

The agreement might almost be called exact. And it seems scarcely less remarkable that the differences between the experimental and the calculated pressures should vary as regularly as is shown in the fourth and fifth columns.

In *Science* of Sept. 2, 1887, Gen. Hazen remarks that the relation between velocity and pressure stated in the above formula "is the most satisfactory yet determined, and does not differ by more than 4 or 5 per cent. from the truth."

JOHN C. TRAUTWINE, JR.

Our Vanishing Forests.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Our forests are rapidly disappearing, and but few people realize that it yearly takes 500,000 acres of forests to supply cross-ties for the railroads of the United States. We have to-day in the United States over 150,000 miles of railroads. Eighteen hundred and eighty-six saw nearly 8,000 miles laid, and about 14,000 miles more were built in 1887. The construction of 14,000 miles of road at 2,700 ties to the mile, means the cutting of 37,800,000 new ties, while one-fifth of the 138,000 miles already constructed must be renewed, taking at same rate 74,500,000 more, a total of 112,300,000 new ties drawn from our standing timber in the past year for railroad ties alone. For all purposes the forest area of America is subject to an annual decrease of over 50,750,000 acres, or at the rate of 139,000 acres for every day, which if concentrated, would lay bare an area equal to the State of Rhode Island in five days, or of the Commonwealth of Massachusetts in 37 days.

Thus it is daily becoming more apparent that this problem will at no remote period imperatively demand solution, and that one of two alternatives must be chosen, either the production of these varieties of timber must be stimulated, or substitutes must be found which will answer in their stead, especially so in the case of ties for our railroads, which are becoming scarcer every year, while the mileage is annually on the increase.

Then, when we learn that some 35,000 saw mills are in operation in the United States, we can well imagine the rate of our forest destruction, and this will aid us to realize that the value of the products drawn annually from the forests amounts to over $1,250,000,000, which is 10 times the interest on our national debt, 12 times the annual gold and silver output, and four times the annual wheat product of our whole country.

Thus it will be seen that the depletion of our forests is going forward at so rapid a rate, that if the most strenuous efforts were made in the way of replanting, it would be impossible to keep pace even with the building of new railroads, to say nothing of the repairs of the old. Then again, beside railroad ties the forests are fast disappearing for many other uses. Telegraph poles, for example, already up represent over 1,500,000 selected trees, and their annual repairs consume at least 400,000 more, while the ties of our railroads demand annually 30 years' growth of 500,000 acres.

Wherever the remaining timber of our country is, whether in the Middle States, West or South, the reckless waste and destruction is going on in the timbered regions without any attempt at reproduction, and the time is at hand when this matter must be thought of seriously or our timber supply will soon run short.

Our railroads cannot wait for new timber to grow for the millions of ties they will need every year, so they are already experimenting with iron and steel ties, even importing the latter from England. But we must look to American inventive genius to produce the tie needed in this country, and he who produces one that can be adopted will reap a rich reward, for even to-day there are thousands of miles of our Western railroads that are bare of timber from which to procure ties for ordinary repairs.

SOUND SLEEPER.

The Use of the Stadia in Railroad Surveying.

BY PROF. J. B. JOHNSON.

IV.

THE LOCATION OF THE LINE.

In previous articles it has been shown how a good contour map may be obtained with a small expenditure of time and money by the use of the transit and stadia-rod with the same parties which are commonly employed in making the ordinary preliminary railroad survey. It was further stated that in "easy country" the ordinary methods should still be pursued, but that *at any time* whenever it seemed advisable by the chief of the party his force could be re-organized into a topographical, stadia surveying party, and the contours obtained over a wider belt, to assist in selecting the best line the ground affords. Exactly when the chief of the party would feel inclined to make this transformation would depend very much on the man as well as on the ground. But there are times doubtless when *any* locating engineer feels the need of a better topographical map than his preliminary line with its cross sections is able to give him. On the same ground some men would need this assistance much more than others, but these questions are not within the province of these articles.

When the contour map is completed we have also done with the methods which are peculiar to the use of the stadia. For the sake of completeness, however, some suggestions as to the proper use of this map in railroad location will be given. Since the line of instrument and rod stations was not made with any reference to the final line, further than that the belt surveyed should include the line, and since there were no 100-foot stakes set, there is as yet no "preliminary line" on the ground or on the map. The instrument and stadia stations (⊙'s and ⊡'s) are, however, well marked on the ground, and are also plotted on the map. These serve for tie lines, by which to check the position of the location when it comes to be run out on the ground.

The Grade Contour.—The map will show what average grade is necessary to use between given fixed points, taken a mile or two apart, and on the assumption that this average grade is to be maintained uniformly between these points, a *grade contour* can be drawn corresponding to this grade. Thus, suppose the average grade between two points should be 0.5 ft. to 100 ft., or 5 ft. in 1,000 ft. If the contours are 5 ft. apart vertically, then our grade will cross a contour line every 1,000 feet. Take a pair of dividers holding a pencil point, and step off distances of 1,000 feet, making short arcs across the contours in the vicinity of the grade. Then sketch in the grade contour, which follows the adjacent contours, but crosses the space included between two contours every 1,000 ft. in distance, or at each of the 1,000 ft. marks just laid down. When this grade contour is properly adjusted it should be inked in as a dotted line, and made complete, so far as the limits of the map will allow. It is of great value as showing the position of the line which would have neither cut nor fill. If our map were for the location of a ditch, for instance, this grade contour would be very nearly the true location, the only deviations from it being for ravine crossings, perhaps.

Projecting the Location.—With the grade contour drawn, and the character of the ground vividly in the mind, the chief of the field party, who has made himself thoroughly familiar with both ground and map, proceeds to lay out the line on the map, giving due weight to all the functions of the problem. There are usually certain controlling points through which it is desirable to carry the line, and these are selected on the map. A *feasible* line is then drawn in pencil, following the grade contour as nearly as may be, keeping somewhat below it on hillsides and somewhat above it on nearly level ground. This will usually be a cheap line in first cost, but containing too much curvature. The curves are fitted to the ground by means of templets, or any of the standard curve protractors, or by the compasses, as preferred. After a mile or two or three have been laid out in this way, a revision is in order. The line should be straightened and shifted here and there, being careful not to overestimate the value of contours on nearly level ground, or to underestimate them on hillsides, until it seems to be the best that can be done on that ground. Then let the transitman and the topographer both go over it and see if they can better it any. Usually they will. In this way as much line may be projected on the map as can be run out in a day. Where curves predominate these should be drawn in first and then connected up by the tangents; but where the tangents form the major part of the line these should be first sketched in and the curves fitted to them.

The field notes may then be taken off. The tangents are measured in distance and their bearings found by means of a paper protractor and a good parallel rule, or by a parallel rule and the metal protractor shown in the previous article (p. 152). The lengths of the curves should be obtained from the deflection angles, these being computed from the measured bearings of the tangents. Thus the only *measurements* are the lengths and bearings of the tangents. The parallel rule should be of heavy metal, moving on cylindrical rollers, some 15 in. long, fitted with a handle at the centre which moves freely about its vertical axis. Thus the rule is moved freely without any twisting strain being brought upon it. Such a rule is of the greatest value in any drawing room, but is especially necessary in topographical drawing, and in graphical analysis of stresses in structures.*

The map should be drawn on small sheets about 19 by 24 in., the topography extending quite to the edge of one where it is lapped over on the next following, the matched position being indicated by two crosses at the lapped edge.

The Preliminary Profile.—After the line is projected on the map a preliminary profile is constructed by reading off the cuts and fills from the contours, and plotting them above or below the grade line, which is first drawn on the profile paper. This profile makes a good study in itself, and may aid in obtaining a better projected line. If the projected line is changed as a result of this profile study, then a new profile must be constructed, to be used as a check on the actual location in the field.

Running out the Line.—When the line is to be run out on the ground the parties are reorganized on the old basis of transit party and level party, the topographer being engaged at camp on the topographical work. The chief of the party accompanies the transit party, carrying the sheets containing the map with the projected location, the profile and a few drawing instruments for field use. The transit party runs out the tangents and puts in the curves, in accordance with the notes taken from the sheet, a convenient form of which is as follows:

LOCATION NOTES FOR X. Y. Z. R. R. FROM MAP NO. ——

LINE.	Bearings and deflection angles.	Length.	Station.	Remarks.
T	N. 80° 40′ E.	1020′	10 + 20	P. C.
3° C. R.	+ 18° 30′	617′	16 + 37	P. T.
T	S. 80° 50′ E.	2670′	43 + 7	P. C.
4° C. L.	− 12° 20′	308′	46 + 15	P. T. S 46° 15′ W. to ⊙ 12,268′.
T	N. 86° 50′ E.	680′	52 + 95	P. C.

Only the lengths and bearings of the tangents are taken from the sheets. The rest are computed. Thus, from N. 80° 40′ E. to S. 80° 50′ E., we have a deflection angle of 18° 30′ to the right. If this be a 3° curve, then its length is 617 ft. Adding 6 + 17 to 10 + 20 gives 16 + 37 as the marking for the P. T. An occasional tie line is put in, as shown in the column of remarks. The transitman runs in the curves upon reaching the P.C.'s, and does not extend the tangents to an intersection. An occasional tie line from a P. C. or a P. T. to a ⊙ or a ⊡, furnishes a good check. If the actual measurements to the reference point do not agree with the notes, this point may be set on the ground by the notes, and a comparison of it with the true point shows the deviation of the line from its projected position on the map. The occasion of such a discrepancy is apt to be errors in the map, and if the preliminary profile differs seriously from the actual profile obtained by the level party, it may be found necessary to correct the line by working backwards from the reference point, and so obtaining a new starting point. The remaining location notes should then be followed, as before.

In any case, the chief engineer would feel free to take great liberties with the projected location notes, and to put the line a little one way or the other when it was evidently best so to do. Or the line might be run out exactly as projected, provided the tie lines showed it to be nearly as drawn on the map, and then the chief of the party might go over it with the map and actual profile, and adjust it here and there, or change the assumed grades by drawing on the actual profile the grade best suited to it. In this case the projected location becomes only a preliminary location, after all, but a much better preliminary line than would have been obtained by the eye on the ground.

In difficult ground it is the writer's opinion that the methods outlined above would give, in experienced and capable hands, the *best* line the ground affords, and he thinks anything short of this makes it only a happy accident if the best line is obtained. At most, the expense of a survey is very small as compared with the cost of mistakes made by hasty and cheap work. But if the stadia be properly used by experienced observers, to obtain only such information as is needed for the purpose, it is the writer's opinion that the cost of the location on very uneven ground, where the work is heavy, would be very little more than it ordinarily is, and that the saving in first cost, and possibly in operating expenses, is apt to be very large. We believe that if it were more generally known with what ease and accuracy topography can be taken on a large scale by the ordinary locating party, the transformation being effected at any moment, and the party again transformed back again into the line organization when the need of contours is no longer felt—if this kind of knowledge were more general with our locating engineers, we believe that it would be done very often on almost all lines, and

* Mr. A. S. Aloe, of St. Louis, made a number of these rules for the late C. Shaler Smith, one similar to which the writer has used for many years with great satisfaction.

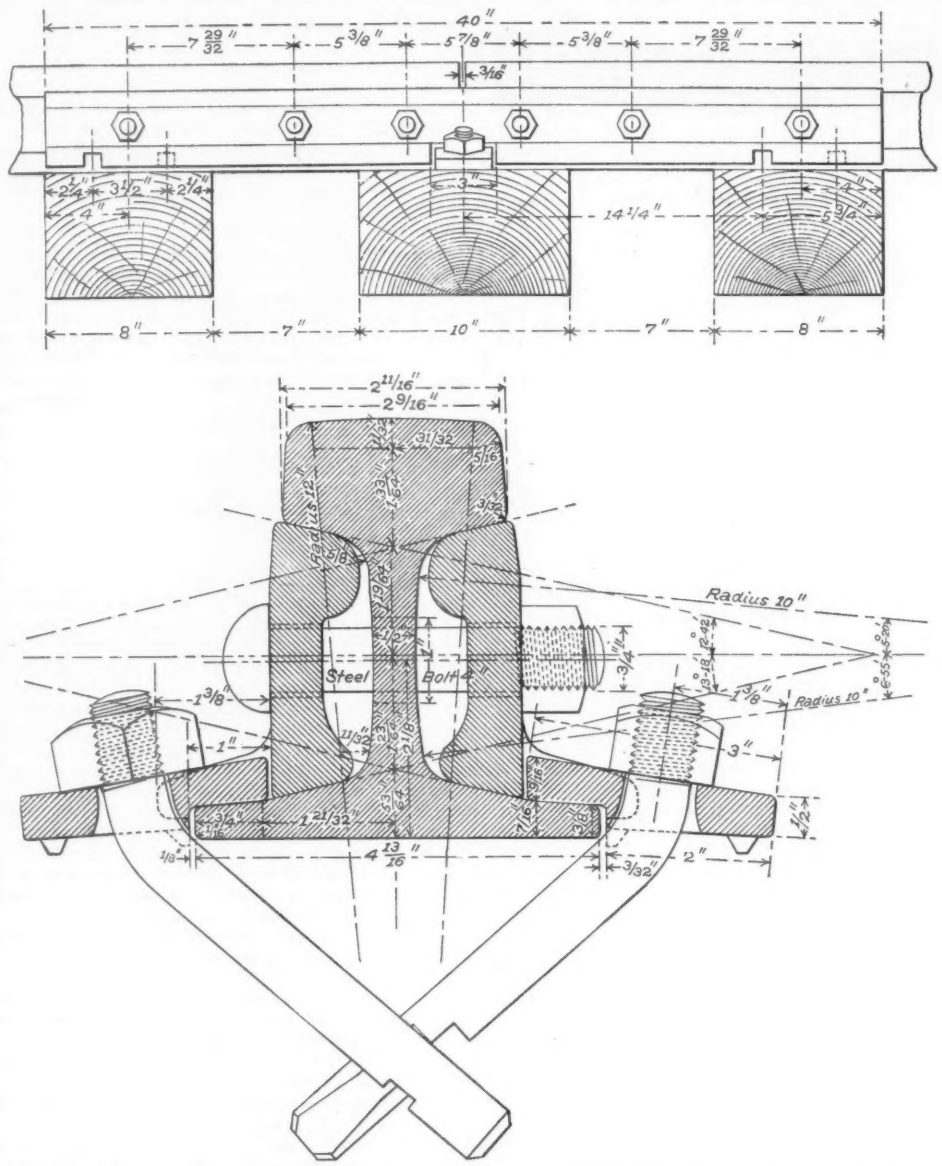
many lines would be so treated throughout. Experience in the use of the stadia would lead to great skill and facility in its use, no more data would be taken than was absolutely required, and we believe the progress would eventually equal that made by the old line parties, with a great deal more data from which to obtain the most favorable location. The writer heartily indorses what Mr. Wellington says on the use and abuse of topography in his "Economic Theory of Railway Location," and still he feels that there is a large field of usefulness for the stadia methods in this direction which has as yet been very inadequately occupied.

The New York Central Joint with Bush's Interlocking Bolts.

The rail joint which is shown in the cuts herewith was designed by Mr. Walter Katté, Chief Engineer New York Central & Hudson River, and is now being applied on 35 miles of double track between Peekskill and Poughkeepsie. It is adapted for an 80-lb. rail, and the Bush interlocking bolts are used in the middle of each rail as well as at the joints. It is a three-tie supported joint, the splices being 40 in. long and weighing 72½ lbs. per pair. It will be seen that the lower flanges of the angle-plates are cut away for three inches at the middle, and clips are inserted under the nuts, which bring the rail ends down to the surface of the tie and hold them there. Each clip has on its under surface lugs which are forced into the surface of the tie and help to prevent any lateral movement.

It will be remembered that in 1884 the New York Central began laying this 80-lb. rail, using Bush's bolts in the middle of the rail as now, and also in the ties adjacent to the joint. This method of securing the rail was adopted in the Grand Central station yard, and on the main line as far as the Harlem River. The joint used was suspended, we believe. The joint now adopted will undoubtedly keep the rails in line and surface very effectually if the middle tie is kept well up. It is an expensive joint, but that objection will be but secondary if it does its work. Cutting away the bottom flange at the middle may prove objectionable. It has been shown that fractures of angle splices usually, if not invariably, begin in the upper flange, but the experience which has gone to prove that has been with the bottom flange intact at the middle. In the present case, so long as the supporting tie is well tamped up there will, of course, be no danger of rupture of the splice from the bottom, but if this tie gets low, the joint may be found weak at that point.

The admirable rail section shown here was illustrated and described in the *Railroad Gazette*, Jan. 16, 1885, when the considerations which led Dr. Dudley to use the proportions adopted were told. It is well to call attention again, however, to its most characteristic features: the broad flat head, sharp upper corner, nearly vertical sides, unusual depth and heavy flange.



THREE-TIE JOINT WITH BUSH'S INTERLOCKING BOLTS—NEW YORK CENTRAL & HUDSON RIVER R. R.

Fall Brook Coal Co.'s Train Rules.

We give below some notes on the uniform code of train rules as adapted for use on this company's road, together with some extracts from it. This code is worthy of note from the fact that the Superintendent of this road has taken much pains in the training of his men and has adopted some original methods. His catechetical questions, which were explained in these columns, will be recalled by the interested reader.

We do not note all the important features of the work, especially those which are similar to those of the Erie's book lately noticed in these columns, which evidently has been consulted in the preparation of this.

Not all of these rules are good ones. All are printed in one style of type, and those of the first portion (as far as the telegraph order rules) are entirely renumbered; that is, after the first interpolation (after Rule 7) every rule has a number different from that in the uniform code. The disadvantage of this has been often pointed out. Some of the new rules lack conciseness and are in language positively weak, while a few of them cover points that have already been fully covered elsewhere. This bad feature is especially noticeable in a work which is so good in the main. A blot is conspicuous on a pure white page. Superfluous rules and phrases have usually been common in the majority of codes, but now that there is a higher standard their uselessness, not to say their evil, stands out much more prominently.

But the prominent features of this code are good ones, and in the following notes we give some of the more noteworthy rules in full.

The "general notice" is unaltered, including the absurd statement from the road to its men that they "should be required to be" polite, etc. Whether the road really will require this is not stated. Rule 8 is slightly altered. Rule 9 is inserted though there are no division superintendents, and the order with the word "division" left out is meaningless. To the eleven general rules are added nine others, forbidding unauthorized absence and the employment of substitutes, and the use of intoxicating drinks; requiring the use of coupling sticks; propriety of conduct and reporting of fellow-servants misconduct; concerning smoking, neatness of premises, custody of switch keys and responsibility for all property intrusted. Rule 21, concerning full-faced type for meeting points, is slightly changed. Rule 22 conforms to the standard in only a few points. Rule 31, concerning fusees, is omitted. Rule 64 is followed by three rules, giving local information about fixed signals, which the uniform code assumes will be shown on time-tables. Rule 68 reads:

When a danger signal (except a fixed signal) is displayed to stop a train, or a signal given by a bell-cord, or trainmen, or any signal by a passing train, it must be acknowledged as provided in Rule No. 50.

Rule 77 is preceded by one concerning the carrying torpedoes, which weakens and tends to nullify portions of Rule 99. To Rule 85 is added:

Should the train having the superior right reach the meeting point first, they shall turn the switch for the opposing train to draw into the siding.

Freight trains are to be kept ten minutes apart.

Rule 93 reads: * * in going on the siding—without backing. When the expected train of the same class is not found at the schedule meeting or passing point the train having the right of track must wait *five* minutes after its schedule time for the expected train (to prevent the chance of accidents arising from the variation of watches), and then run *five* minutes late, approaching all sidings prepared to stop until the expected train is met or passed.

The forward brakeman, not the fireman, is charged with flagging duty. Rule 99 reads:

When a train is stopped by an accident or obstruction, or is unable to make its usual rate of speed, the flagman must *immediately* go back with danger signals to stop any following train. This must always be done whether another train is expected or not; and in carrying out this rule *the utmost promptness is necessary*—not a moment must be lost in inquiring as to the cause of detention or stoppage, or its probable duration. At a point, etc.

This rule is followed by this:

Flagmen must be sent back as soon as they can get off safely (never less than eight miles per hour), and under no circumstances wait until the train comes to a full stop before starting, and must not be called in until the train is started and a signal given from the rear end that the train is all together. The train must then move very slowly until the flagman overtakes it. When it is necessary for the flagman to go back to protect the rear of his train, the next brakeman must immediately take the flagman's position on the train, and remain there until relieved by the flagman.

Rules 101, 102 are omitted, and in their place is the following:

All operations of switching trains, cars or engines, or of crossing from one track to another, must be performed only at such time and in such manner as to prevent the *chance* of accident, and no car or engine must be allowed to stand on the main track without proper signals to protect it.

Rule 104 reads, "When a train is being pushed or is running without an engine," etc. Rule 108 is followed by these four:

When a passenger train is disabled and is overtaken by an inferior train, the conductor of the passenger train may require a change of engines as provided in Rule No. 140, or may arrange with the conductor of the inferior train to proceed and report at the first telegraph office.

When a regular train, waiting at a siding where there is no telegraph office, for a superior train bound in the opposite direction, is overtaken by another train of the same or inferior class, having orders against such superior train to a siding further on, the train having the prior right per time table will proceed upon the order, and the other train will put a flag on it and both report at the first telegraph office to the superintendent.

Before going to a siding, at which there is no telegraph office, to pass a train having the right of the track, the conductor must always ask if there are any orders against such train at the last telegraph office.

A train after waiting thirty minutes at a siding where there is no telegraph office for a superior train bound in the same direction must place two torpedoes on the track at a safe distance back of their train, and then proceed, keeping careful lookout for the following train, and allow them to pass at the first siding when overtaken. If, however, the following train is a passenger train, a flagman must be left to give warning.

Rule 110 places all trains under direct orders from superintendent. Rule 113 is followed by this:

Should a train have orders against a superior train to a certain point and then return from such designated point before the arrival of the train against which they were given the right of track, a register must be given to the agent and operator there, or a man left to inform the superior train of their arrival and fulfillment of the order.

Rule 115 is omitted, the road having no double track; No. 116 is omitted, but covered elsewhere. The last two rules in the first portion of the code proper, 120 and 121, are preceded by a number of original rules, among which are:

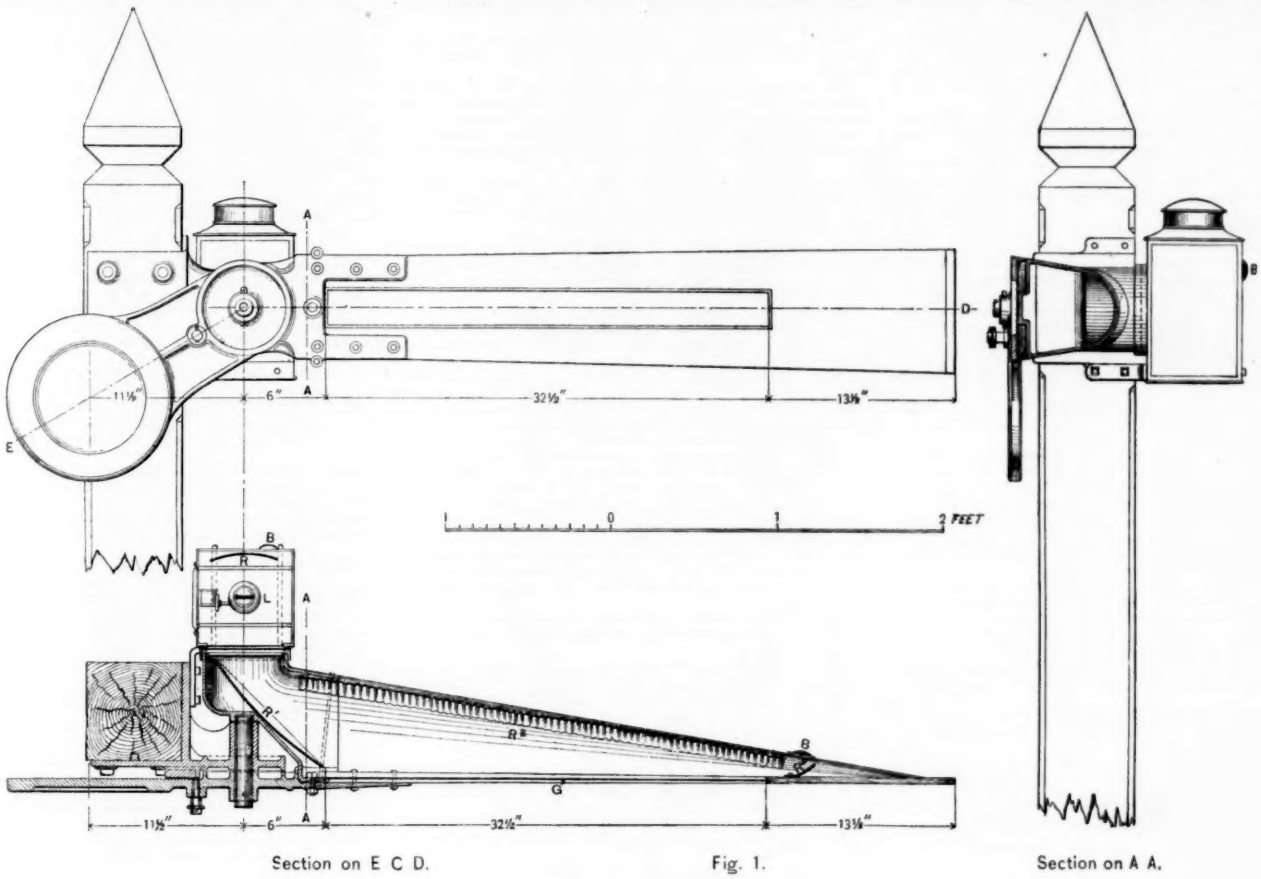
134. When following other trains on the same schedule or rights, they must keep a sharp lookout for the traim immediately preceding them, especially when running around curves and closing in at stations.

135. When one train overtakes another, and both are united and run as one train, great care must be taken to notify all station agents and conductors of other trains that it is a double train.

137. When flagmen are sent to hold trains at a station until another train arrives there, the conductor and engineman must require the flagman to repeat his order in the presence of another employé of their train, and the flagman must not go until he has repeated such order and received notice of its correctness from the conductor or engineman sending him. When practicable, the flagman must ride on the engine and notify the engineman and other employés of that train *where* and for *what* purpose he is going. When conductors and enginemen receive orders they must notify the firemen and brakemen, so that all concerned will know where they are to meet trains, and govern themselves accordingly.

145. When special orders, supplements to the time-tables, or notices involving the safety of trains are received, the engineman shall see that the fireman reads and understands them, and the conductor shall see that his baggage master, or, on freight trains, all his brakemen read and understand the same. Firemen, baggage masters or brakemen, having read orders as above, will be expected to keep them in mind and be prepared to correct any mistake which comes under their observation.

149. No coal or freight train must be moved down a grade without one man in the centre of it, and when the other work will allow two men must be stationed at proper distances, and on heavy grades all hands must be equally distributed on the train. In foggy weather the men must be stationed so they can see from one to the other the entire length of the



Section on E C D. Fig. 1. Section on A A.

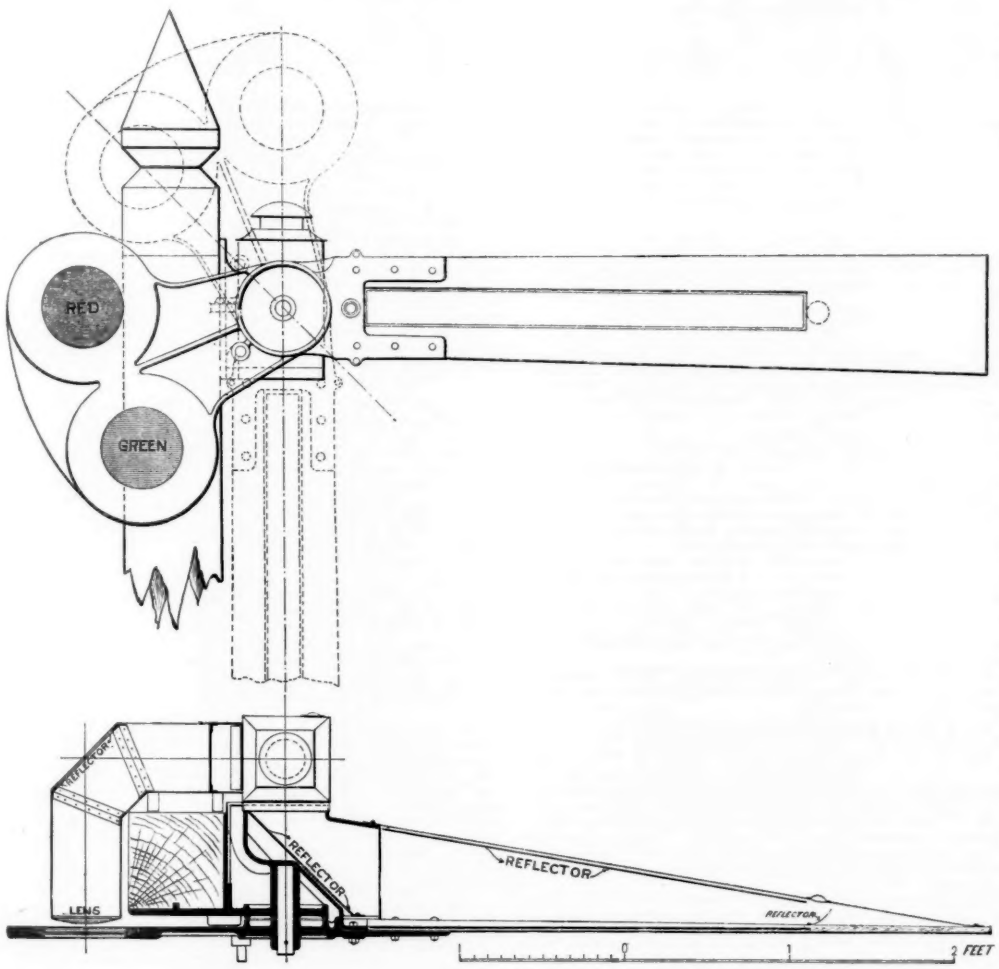


Fig. 2.

ILLUMINATED SEMAPHORE SIGNAL.

Made by the UNION SWITCH & SIGNAL CO., *Pittsburgh, Pa.*

train and watch carefully for signals from each other. Conductors and enginemen must not move their train until they know the men are properly stationed as above.

We notice few alterations in the telegraphic-order rules. Enginemen's signatures are required. Rule 524 A is used, but is slightly changed. No. 526 is in form similar to the Erie's.

The uniform code is followed by rules for conductors, enginemen, firemen, brakemen, telegraph operators, track repairers and for work trains. These are supplemented by chapters on air brakes and New York state laws, which end the book. These additions to the uniform code are generally pretty good, though they repeat some things unnecessarily. Firemen must examine bulletins the same as enginemen. Engmemen's rule 15 is as follows:

It is required of both enginemen and firemen to keep a careful lookout from the engine. When rounding curves, take position on the inside of curve, and keep sharp lookout until a straight line is reached. Be particular to regard signals immediately on coming within view of the same. *In any case of doubt*, arising from foggy weather or other causes, *stop the train* till the track is known to be clear.

The rules for telegraph operators are better than the average. Operators' rule 24 reads:

Arriving time of a train is the time at which the engine reaches the station, but it must not be reported until the *markers* of the train have been seen. *Departing time* will be recorded when the rear of the train, with markers attached, passes the office.

Trackmen's rule 7 reads:

In foggy weather, when a train cannot be seen at 300 yards, trackmen must suspend ordinary work and patrol the track, acting as signalmen to warn trains of danger, should there be any.

Illuminated Semaphore Signals.

That a position signal is better than a color signal either by day or by night is no longer questioned, and the steady increase in the use of the semaphore form of signal is evidence of its efficiency. Various devices have been employed for illuminating the semaphore blade so as to get a good position signal at night, but they have generally failed from defective illumination. When the lamp is placed in front of the signal it is found that the rays reflected are so diffused that the semaphore is visible at so little distance as to be useless except for yard purposes, or other places where trains are moved but slowly.

The device illustrated herewith is the design of Messrs. Spicer and Schreuder, and is made by the Union Switch & Signal Co. Twelve of these signals have been in use on the Old Colony for about a year, and it is said have been found satisfactory. The Pittsburgh, Fort Wayne & Chicago put in one last year for trial, and has lately ordered five more. We are told that the signal is now being tested on the Pennsylvania Railroad.

In fig. 1 the semaphore is shown as designed to dispense with colored disks, and in fig. 2 it is shown with red and green disks, for a three position signal. Another design is also made with only a red disk. That, however, it is not necessary to show, as the arrangement will be understood at once from fig. 2.

The construction of this illuminated semaphore is very clearly shown in the illustrations. The reflectors are shown at *R R'*, etc. That in the semaphore arm is concave and corrugated, as represented in fig. 1. The reflected light is thrown forward through a plain glass *G*, 32 in. long and 2½ in. wide. The divergence of the rays would naturally make the arm of light so shown appear larger than the actual dimensions of the glass. We are informed that from actual trial it is found that the illuminated arm can be seen as far as the red disk with a lens behind it. The glass is put in with rubber packing, to diminish the chance of breaking. The lamp *L* is of the same size and power as that used in the ordinary signal of the Union Switch & Signal Co. At *B B* are shown lenses for back lights to let the signalman see that the lamp is burning and that the signal goes to its proper position.

Train Accidents in February.

COLLISIONS.

REAR.

1st, on Boston & Maine, at Boscawen, N. H., a freight train ran into a wrecking train which had stopped to do some work. The freight engine and 1 car were damaged and the wrecking derrick was thrown over upon the tender of the other engine, crushing the tank.

1st, on West Shore, in the tunnel at Weehawken, N. J., a freight train, the engine of which was running backwards, ran into an empty passenger car which had broken loose from the rear of a preceding train and was left standing in the tunnel. The block signal operator, on seeing the passen-

ger train emerge from the tunnel, reported to the operator at the other end that the track was clear.

1st, on New York, Lake Erie & Western, at Salamanca, N. Y., a passenger train ran over a misplaced switch and into a tank car containing crude oil. The oil caught fire and 17 freight cars were burned up. Three trainmen and a passenger injured.

3d, on Chicago & Northwestern, in Chicago, Ill., passenger train ran into a freight car standing on the main track, doing some damage and killing a passenger.

5th, on New York, Chicago & St. Louis, near Westfield, N. Y., a freight ran into a preceding freight and the engine, caboose and 3 cars were derailed and thrown down an embankment.

6th, on Philadelphia & Reading, at Port Clinton, Pa., a freight train which had been left standing on the main track while the engine went ahead to do some switching was run into by a closely following coal train, damaging the engine and 20 cars.

7th, on New York, Lake Erie & Western, at Jamestown, N. Y., a freight ran into a preceding freight, damaging engine, caboose and several cars.

8th, on New York, Lake Erie & Western, near Narrowsburg, N. Y., a freight ran into a preceding freight, damaging engines and several cars.

8th, on Philadelphia & Reading, near Lewiston, Pa., a freight ran into a preceding freight, wrecking engine, caboose and several cars.

8th, on Delaware, Lackawanna & Western, in Passaic, N. J., several cars of a passenger train were derailed and damaged by the rear car of a switching freight projecting over the main track from a siding; 1 passenger injured.

8th, on Boston & Maine, near Lowell Junction, Mass., a freight ran into the rear of freight which had stopped to do some switching; engine and several cars derailed, the latter being thrown down an embankment.

8th, on New York, Lake Erie & Western, at West Newburg, N. Y., engine and caboose moving backwards at considerable speed ran into the rear of a passenger train, telescoping the caboose; 1 trainman killed and 3 injured.

11th, on Chicago & Grand Trunk, at Edwardsburg, Mich., passenger train ran into the rear of a freight just going into a siding, damaging engine, caboose and several cars; 1 trainman injured.

12th, an Ohio & Mississippi passenger train ran into a Wabash passenger train in St. Louis, Mo., damaging an engine and several cars.

14th, on Cleveland & Pittsburgh, at Ravenna, O., a freight ran into the rear of a freight going into a siding, disabling the engine and damaging several cars. Engineer and fireman injured by jumping.

15th, on Old Colony, at South Framingham, Mass., a switching freight backed into a string of cars on a side track, damaging several cars. The engine with some cars had just pulled out of the side track, and in backing up the engineer was deceived by the switch lamp; the door, in which was a red glass, had jarred open, so that the light appeared white, indicating that the switch was set for the main track when it was really set for the side track.

15th, on Memphis & Charleston, at Paint Rock, Ala., freight train derailed and engine overturned by a box car which had been run out of a siding by alleged train wreckers and blocked with cross ties so as to obstruct the main track, injuring engineer and fireman, the latter fatally.

16th, on Housatonic, at Bethel, Conn., passenger train ran into a preceding freight train, wrecking engine and several cars.

16th, on Rome, Watertown & Ogdensburg, at Canton, N. Y., passenger train which had stopped to make repairs was run into by a closely following freight train, damaging engine and several cars; 1 passenger killed and 2 injured.

18th, on New York, Lake Erie & Western, at Washingtonville, N. Y., a freight ran into a preceding freight, damaging engine, caboose and 3 cars. The wreck caught fire and was destroyed.

20th, on Chicago & Northwestern, at Elburn, Ill., a passenger train ran into the rear of a freight going into a siding, doing some damage; fireman killed.

20th, on New York, Lake Erie & Western, at White Bridge, N. Y., a freight train broke in two and rear section ran into forward one, wrecking 10 cars.

22d, on Central Pacific, at Blue Creek Station, Utah, engine of passenger train disabled and several cars damaged by striking a freight car projecting from a siding over the main track.

24th, on Chicago & Northwestern, at Stockton, Minn., a freight train ran over a misplaced switch and into some cars standing on a side track, wrecking engine and 9 cars.

A following freight immediately ran into the first.

24th, on Union Pacific, at Colton, Neb., passenger train running at high speed struck a freight going into a siding, making a bad wreck. Several cars loaded with gasoline immediately burst into flames and the wreck was partially consumed. Engineer killed and fireman and 10 passengers injured.

27th, on Louisville & Nashville, near Nashville, Tenn., a freight train broke in two and rear section ran into forward one, wrecking several cars; 1 trainman killed.

28th, on Lake Shore & Michigan Southern, near Baw Beese Lake, Mich., a freight train was run into by two engines moving in the same direction and having orders to pass the freight at the first stopping point. The forward engine, caboose and several cars were wrecked. An engineer was injured by jumping.

29th, on New York, New Haven & Hartford, at Thompsonville, Conn., a freight ran into a preceding freight which had stopped to do some switching, demolishing engine, caboose and 3 cars.

29th, on New York, Lake Erie & Western, at Union, N. Y., freight train ran into the rear of a preceding freight which was standing at the station with no signals out. Engine and 5 cars wrecked.

BUTTING.

1st, on Erie & Wyoming Valley, near Pittston, Pa., butting collision between two locomotives, wrecking both; engineer killed.

2d, on Chicago & Northwestern, near Huron, Dak., butting collision between two freights, fatally injuring an engineer.

5th, on Lake Shore & Michigan Southern, at Edgarton, O., butting collision between two freights, damaging both engines and 15 cars.

6th, on Fitchburg, at Hoosac Falls, N. Y., passenger train ran into the head of a freight standing on the main track.

6th, on Central Pacific, near Gold Run, Cal., butting collision between a passenger train and a freight demolished 4 engines and several cars; one trainman killed and 2 injured.

7th, on Central Vermont, in Plainfield, Vt., butting collision between two freight trains, wrecking engine and several cars; one trainman injured.

9th, on Central of Georgia, at Boneville, Ga., butting collision between two freight trains, wrecking the engines and several cars; engineer injured.

10th, on Baltimore & Ohio, near Dayton, Pa., butting collision between two freight trains, disabling both engines and damaging several cars.

13th, on Northern Pacific, near Motley, Minn., butting collision between two freight trains, wrecking both engines and 10 cars.

16th, on Memphis & Charleston, near Huntsville, Ala., butting collision between two freights, doing considerable damage.

17th, on Southern Pacific, in Lordsburg, N. M., butting collision between a freight train and a switching freight damaged both engines and 4 cars, injuring a fireman.

18th, on Central Pacific, near Wells, Nev., butting collision between two freights, wrecking two engines and several cars.

22d, on West Jersey, at Millville, N. J., butting collision between two freight trains, wrecking both engines and 4 cars; a fireman killed. One of the trains failed to take a side track, as ordered.

23d, on Philadelphia & Reading, near Wayne Junction, Pa., butting collision between a passenger train and a locomotive, damaging both locomotives; 1 trainman and 2 passengers injured.

24th, at New Boston, Pa., butting collision between a Pennsylvania and a Lehigh Valley passenger train, damaging both engines and several cars; engineer and several passengers injured.

24th, on Pittsburgh, Fort Wayne & Chicago, at Etna Green, Ind., where one train was to take a siding, butting collision between two freights caused by the brakemen losing control of it, wrecking both engines and 12 cars.

24th, on Pennsylvania, in Camden, N. J., a butting collision between two switching engines disabled both.

27th, on Chicago & Alton, in Chicago, Ill., a butting collision between a passenger train and a switching engine, owing to a misplaced switch, disabled both engines.

27th, on Chicago, Burlington & Quincy, near Naperville, Ill., a passenger engine returning for its train after having been cut loose and run ahead for water, was backed into the train at considerable speed, doing some damage and injuring several trainmen. It is said that the engineer was inexperienced.

28th, on Union Pacific, at Hilliard, Wyo., butting collision between two freights wrecked both engines and several cars, killing an engineer.

28th, on Philadelphia & Reading, at Robesonia, Pa., butting collision between two freights wrecked both engines and several cars, injuring 4 trainmen. One of the trains having gone into a side track, could not be stopped until the engine had passed the switch and obstructed the main track.

CROSSING.

8th, on Central of New Jersey, in Plainfield, N. J., a freight ran into another freight at a crossing, wrecking several cars; brakeman injured.

11th, in Miller's Ind., a Baltimore & Ohio freight ran into a Lake Shore & Michigan Southern freight, damaging an engine and 5 cars.

15th, a Louisville & Nashville switching freight was backed into the rear car of an Atlanta & West Point passenger train at the crossing in Montgomery, Ala., doing some damage.

24th, a Brooklyn, Bath & West End passenger train ran into a New York & Sea Beach passenger train at the crossing in Bath Beach Junction, N. Y., overturning and wrecking the rear car.

27th, at Fulton, Ill., a Chicago, Burlington & Quincy passenger train, moving at considerable speed, ran into a Chicago, Milwaukee & St. Paul passenger train which was behind time and which was just starting after having made the customary crossing stop, striking the rear truck of the tender and fore truck of the express car, the locomotive of the former being derailed and rolled down an embankment; 8 trainmen injured.

27th, on Chicago, Burlington & Quincy, at Pacific Junction, Ia., a passenger train ran into an engine standing across its track, doing slight damage. It is said that the engineman was inexperienced.

DERAILMENTS.

DEFECTS OF ROAD.

1st, on Texas & Pacific, near Longview, Tex., passenger train derailed by a defective switch, wrecking the engine and several cars; 1 trainman killed and 3 employés injured.

1st, on Chicago, St. Paul, Minneapolis & Omaha, near Chippewa Falls, Wis., 4 cars of a freight ditched by a broken rail, injuring a trainman.

1st, on New York, Lake Erie & Western, in West Newburg, N. Y., 10 cars of a freight thrown from the track by a broken rail.

2d, on New York & New England, near Norwich, Ct., caboose of a freight train was thrown from the track by a broken rail and overturned, landing on the ice in the Thames river; conductor and 17 laborers injured.

2d, on New York, Ontario & Western, near Trout Brook, N. Y., rear car of passenger train thrown from the track by spreading of rails; conductor injured.

2d, on New York, Ontario & Western, near Trout Brook, N. Y., 16 cars of a freight thrown from the track by the spreading of the rails, some of them being overturned and considerably damaged.

2d, on Fitchburg, at East Fitchburg, Mass., passenger train thrown from the track by a broken rail and 1 car damaged, injuring a brakeman.

2d, on Pittsburgh & Lake Erie, at Alequippa, Pa., 15 cars of a freight thrown from the track by a broken rail.

5th, on New York, Pennsylvania & Ohio, at Steamburg, N. Y., the third car of a passenger train, running rapidly, was derailed by a broken frog and hurled against the caboose of a freight standing on an adjoining track, wrecking both cars; 3 trainmen in the caboose and 1 passenger killed, and 6 passengers injured.

8th, on Chicago, St. Paul, Minneapolis & Omaha, near Melrose, Minn., passenger train thrown from the track by a broken rail.

9th, on Chicago, Rock Island & Pacific, near Unionville, Ia., passenger train thrown from the track by a broken rail, the rear sleeping car going over an embankment, injuring 3 passengers.

10th, on Boston & Albany, at Kinderhook, N. Y., 16 cars of a freight derailed by a broken rail.

11th, on Chicago & Northwestern, near Oak Creek, Wis., 18 cars of a freight were thrown from the track by a broken rail and damaged.

11th, on Chicago, St. Paul, Minneapolis & Omaha, near Blakley, Minn., a bridge gave way under a passing freight and 11 cars were wrecked.

12th, on Pennsylvania, at Rohrerstown, Pa., 11 cars of a freight thrown from the track by a broken rail and badly wrecked, injuring a brakeman.

13th, on Pennsylvania, near Menlo Park, N. J., freight train derailed by a broken frog; fireman injured.

13th, on New York, New Haven & Hartford, near Unionville, Ct., passenger train thrown from the track by the spreading of the rails, and 2 cars thrown down an embankment, injuring 2 trainmen and 7 passengers.

14th, on Pennsylvania, near Spotswood, N. J., engine and several cars of a coal train derailed by defective switch; engineer and fireman injured by jumping.

15th, on Wisconsin Central, at Weyauwega, Wis., passenger train thrown from the track by a broken rail and one car turned over on its side, injuring a passenger.

19th, on Chicago, Kansas & Nebraska, near McFarland, Kan., a bridge which had been impaired by a freshet gave way under a passing freight train, the tender and 10 cars going down with it. The engine did not go down, but the violent shock threw the engineer, fireman and brakeman out of the cab; fireman killed, and engineer and brakeman injured.

22d, on Boston & Maine, at West Rochester, N. H., 17 cars of a freight train thrown from the track by a broken rail.

25th, on Indiana, Bloomington & Western, near Mackinaw, Ill., all but the engine and rear car of a passenger train went through a culvert which had been impaired by heavy rains, injuring several passengers.

DEFECTS OF EQUIPMENT.

1st, on Old Colony, near Tremont, Mass., car of a passenger train derailed by a broken wheel.

2d, on Central of Georgia, at Brown's Hill, Ga., 3 cars of a passenger train derailed and ditched by a broken wheel.

4th, on Cincinnati, Hamilton & Dayton, near Hamilton, O., tender of engine of passenger train derailed by a broken journal-box.

4th, on Northern Central, at Havana, N. Y., a car in a freight train derailed by a broken truck.

9th, on St. Paul, Minneapolis & Manitoba, at Clontarf, Minn., passenger train derailed and several cars damaged by broken flange on wheel under the engine; 14 passengers injured.

9th, on Central of New Jersey, near Tamaqua, Pa., 7 cars of a freight derailed by a broken axle and badly wrecked.

9th, on New York Central & Hudson River, near Canastota, N. Y., a car in an east-bound freight was derailed by a broken truck, and thrown over so as to foul the adjoining track.

10th, on Jeffersonville, Madison & Indianapolis, at Austin, Ind., 9 cars and caboose of a freight were derailed by a broken axle, and badly wrecked, injuring the conductor.

10th, on Pennsylvania, at Edgewater Park, N. J., a car of a coal train thrown from the track by a broken axle.

10th, on Pittsburgh, Fort Wayne & Chicago, near Columbiana, O., several cars of a freight train derailed by a broken wheel.

11th, on Norfolk & Western, near Pulaski, Va., two cars in a freight train derailed and wrecked by a broken truck.

13th, on Delaware, Lackawanna & Western, near Stroudsburgh, Pa., a train of 23 "palace" stock cars was derailed by a broken axle while descending a steep grade at a considerable speed. Nearly the whole train went down a high bank, and about 400 head of cattle were killed. The fireman and 2 brakemen were injured, but the rest of the men escaped by jumping into the deep snow.

13th, on Atchison, Topeka & Santa Fe, near Peach Springs, Ariz., a wheel under a car in a freight train broke, ditching 6 cars and killing a tramp.

13th, on Pennsylvania, near Granville, Pa., several cars of a freight were derailed and wrecked by a broken truck, injuring 2 trainmen.

16th, at Louisville, New Orleans & Texas, near Clayton, Miss., a car in a freight train broke in two and fell upon the track, derailing most of the train. Two trainmen injured by jumping.

17th, on Chicago & Northwestern, at Geneva, Ill., several cars of a freight train derailed by a broken wheel.

19th, on Boston & Providence, at Readville, Mass., passenger train derailed by a broken wheel.

23d, on New York, Lake Erie & Western, near Bradford, Pa., as a freight train, consisting of engine and 7 cars, was descending a very steep grade, the brake chain of one of the cars broke, allowing the train to run down grade at very high speed and consequent derailment at the foot of the grade, the entire train being overturned in the ditch; 1 trainman and 1 passenger killed, and 4 trainmen injured.

24th, on Chicago, Burlington & Quincy, near Hill's Grove, Ill., 8 cars of a freight derailed and wrecked by the breaking of a wheel.

24th, on Louisville & Nashville, near Mason, Tenn., several cars of a freight were derailed and wrecked by the breaking of an axle.

NEGLIGENCE IN OPERATING.

1st, on Oxford & Henderson, near Oxford, N. C., 2 cars of a freight broke loose and ran down grade and were wrecked.

1st, on Central of New Jersey, at Bay Side, N. J., a car of a freight broke loose and ran down grade through an engine-house and off the end of the track into a marsh.

3d, on Southern Pacific, in Los Angeles, Cal., passenger train struck a misplaced switch, derailing engine and tender.

6th, on Fitchburg, at North Adams, Mass., in making a flying switch 2 cars of lumber were run into a turn-table pit.

11th, on Boston & Providence, in Providence, R. I., the trucks of a passenger car which was being switched were thrown upon different tracks and the car ran along until the trucks got so far apart that one of them was derailed. A freight car on a side track was damaged.

16th, on Duluth, South Shore & Atlantic, near Marquette, Mich., a heavy ore train running down a grade could not be controlled and ran to the bottom at high speed. The caboose was cut loose and the engine and 3 cars remained on the track, but 27 cars were derailed and piled up in a very bad wreck.

20th, on Lake Shore & Michigan Southern, at Grand Crossing, Ill., passenger train derailed by a properly thrown but unsecured switch.

23d, on Wilmington & Weldon, near Tillery, N. C., a mixed train was run into a gravel pit and derailed by a misplaced switch.

23d, on Chicago & Eastern Illinois, at Cape Creek, Ill., a freight train which had become unmanageable in descending a heavy grade was run onto a spur and derailed to prevent its dashing into the rear of a passenger train; the engine and 20 cars were piled up in a bad wreck. Engineer injured by jumping.

26th, on Northern Pacific, at Puyallup, W. T., engine of passenger train derailed by a misplaced switch.

UNFORESEEN OBSTRUCTIONS.

2d, on Atlanta & West Point, near Palmetto, Ga., engine and several cars of a freight were derailed at a point where rail fastenings had been removed by train wreckers.

4th, on Norfolk & Western, near Foster Falls, Va., work train derailed by a land slide.

6th, on Portland & Rochester, near Saccarappa, Me., engine of passenger train derailed by ice.

9th, on New York Central & Hudson River, near Canastota, N. Y., engine and several cars of a west-bound passenger train were derailed by a car of an east-bound freight which had been derailed and thrown over so as to obstruct the adjoining track.

14th, on Missisquoi Valley, near St. Albans, Vt., snow-plow train thrown from the track in a snowdrift and upset.

14th, on Louisville, New Albany & Chicago, near Harrodsburg, Ind., passenger train struck a bowlder which had rolled down upon the track in a deep cut and the engine was badly wrecked; fireman killed and engineer severely injured.

16th, on Southern Pacific, near Mojave, Cal., several cars of a freight were derailed at a point where the road-bed had been washed out.

17th, on Louisville & Nashville, near Brewton, Ala., a freight train ran over (in the night) a pair of oxen lying on the track and the engine and 11 cars were derailed and damaged, the former being upset.

19th, on Union Pacific, near Leavenworth, Kan., freight train derailed at a point where the road bed had been impaired by freshet; engineer and fireman injured.

20th, on Union Pacific, near Holton, Kan., construction train ran into a washout, wrecking engine and several cars; engineer and brakeman scalded, the latter fatally.

20th, on Union Pacific, near Glenn's Ferry, Idaho, a freight train ran over some cattle, derailing several cars and killing 2 tramps.

UNEXPLAINED.

1st, on Wabash, in Chicago, Ill., 12 cars of a freight derailed at a crossing, 5 of them being badly damaged.

1st, on Boston & Albany, at West Warren, Mass., a car in a freight train derailed.

4th, on New York, Lake Erie & Western, at Wellsburg, N. Y., several cars of a freight train derailed.

4th, on Delaware & Hudson Canal Co.'s road, near Green Ridge, Pa., passenger train derailed.

4th, on Ohio & Mississippi, near Cold Springs, Ind., passenger train derailed and one car badly damaged.

6th, on Illinois Central, near Masonville, Ia., several cars of a freight derailed.

6th, on Illinois Central, near Galena, Ill., freight derailed and several cars wrecked.

6th; on East & West Alabama, near McGinnis, Ga., 1 passenger and 2 freight cars of accommodation train were derailed and went over an embankment, injuring sev-ral passengers.

6th, on Fitchburgh, at Shelburne Falls, Mass., 4 cars of a freight derailed.

7th, on New York Central & Hudson River, in Rochester, N. Y., engine and car of a switching freight derailed.

7th, on Jacksonville & Southeastern, near Athens, Ill., caboose and 5 cars of a freight were derailed and went over an embankment, injuring 8 passengers in the caboose.

8th, on Pennsylvania, near Conestoga, Pa., a car of passenger train jumped the track.

9th, on Delaware, Lackawanna & Western, near Boonton, N. J., locomotive of coal train was derailed and exploded its boiler.

9th, on Housatonic, near Bridgeport, Ct., engine of a freight train derailed.

10th, on Pittsburgh & Western, near Newton Falls, O., 3 cars in a stock train were derailed, 2 of them going over an embankment.

10th, on Pennsylvania, near Shamokin, Pa., 3 cars of a passenger train derailed and damaged, injuring a trainman and several passengers.

11th, on East Tennessee, Virginia & Georgia, near McDonough, Ga., freight train derailed.

11th, on Central of New Jersey, near Bergen Point, N. J., a car in a freight train jumped the track.

13th, on Pennsylvania, near Menlo Park, N. J., a car of a passenger train derailed in backing through a cross-over track.

13th, on Chicago & Grand Trunk, near Cotterville, Mich., engine of passenger train derailed, fireman hurt by jumping off.

14th, on Americus, Preston & Lumpkin, near Lumpkin, Ga., a car in a freight derailed on a trestle.

14th, on Boston & Maine, near Plaistow, N. H., 12 cars of a freight derailed and wrecked.

14th, on Boston & Albany, near North Wilbraham, Mass., 2 cars of a freight derailed and thrown down an embankment.

14th, on New York & New England, at East Hartford, Ct., passenger train derailed.

15th, on Seattle, Lake Shore & Eastern, in Seattle, W. T., locomotive pushing a train of freight cars went off a wharf and was submerged in 20 feet of water. Engineer and fireman leaped out of the cab and swam about until picked up by a boat. The engine went down alone, the coupling having given way.

15th, on Delaware, Lackawanna & Western, near South Orange, N. J., a car in a passenger train derailed.

15th, on New York, New Haven & Hartford, near Easthampton, Mass., passenger train running about 35 miles an hour, derailed on a curve and tipped into a snow bank. No serious injuries reported.

15th, on Chicago, St. Paul & Kansas City, near Galena, Ill., a car in a freight train was derailed from some unknown cause. The train ran over half a mile to a bridge which it knocked down, wrecking six cars and killing a brakeman.

16th, on New York Central & Hudson River, at Middleport, N. Y., engine and several cars of a switching freight derailed.

17th, on Chicago, Milwaukee & St. Paul, at Pickering Hill, Minn., passenger train derailed; 1 trainman injured.

18th, on Burlington & Missouri River, near Table Rock, Neb., 3 cars of a freight derailed.

18th, on Louisville & Nashville, near East St. Louis, Ill., engine of passenger train derailed.

19th, on Southern Pacific, near Pantano, Ariz., 2 cars and a dead locomotive in a freight train derailed and damaged.

19th, on New York Central & Hudson River, near Lyons, N. Y., 8 cars of a freight train derailed.

21st, on St. Louis & San Francisco, near Carthage, Mo., several cars of a freight train were derailed and wrecked.

21st, on Louisville & Nashville, at East St. Louis, Ill., rear car of a passenger train derailed, knocking down several telegraph poles.

24th, on Central Pacific, at Gold Run, Nev., several cars of a switching freight derailed.

24th, on Southern Pacific, near Delano, Cal., 8 cars of a freight train derailed, and several of them wrecked.

24th, on Louisville & Nashville, near East St. Louis, Ill., engine of passenger train derailed.

24th, on Boston & Albany, near Barre Plains, Mass., 3 cars of a freight train derailed.

29th, on Cincinnati Southern, near Greendale, Ky., several cars of a passenger train derailed.

OTHER ACCIDENTS.

2d, on Beech Creek, at Hawks Run, Pa., boiler of a locomotive exploded, killing a fireman.

3d, on Housatonic, near Great Barrington, Mass., locomotive of a passenger train broke a tender wheel.

7th, on West Shore, near New Durham, N. Y., engine of a New York, Ontario & Western passenger train broke a parallel rod, the loose end crushing through the cab, injuring the engineer. The fireman jumped and was badly injured.

9th, on Chicago & West Michigan, near Jenisville, Mich., engine of passenger train broke a parallel rod, the loose end demolishing the cab and killing the fireman.

9th, on Cincinnati, Wabash & Michigan, near Summitville, Ind., parallel-rod of engine of passenger train broke and damaged the cab.

10th, on Boston & Albany, near Templeton, Mass., engine of passenger train broke a tire.

14th, on Concord, near Massabesic, N. H., engine of passenger train badly damaged by the breaking of a parallel-rod; engineer severely scalded.

15th, on Missouri Pacific, near St. Auberts, Mo., a chair car and a coach in a passenger train were burned up. The fire started from a Baker heater.

16th, on Pennsylvania, near Jersey City, N. J., the forward driving-wheel axle of engine of passenger train broke, wrenching off the connecting rods and knocking out the cylinder heads. The driving wheel struck and damaged the forward car and dropped upon the adjoining track.

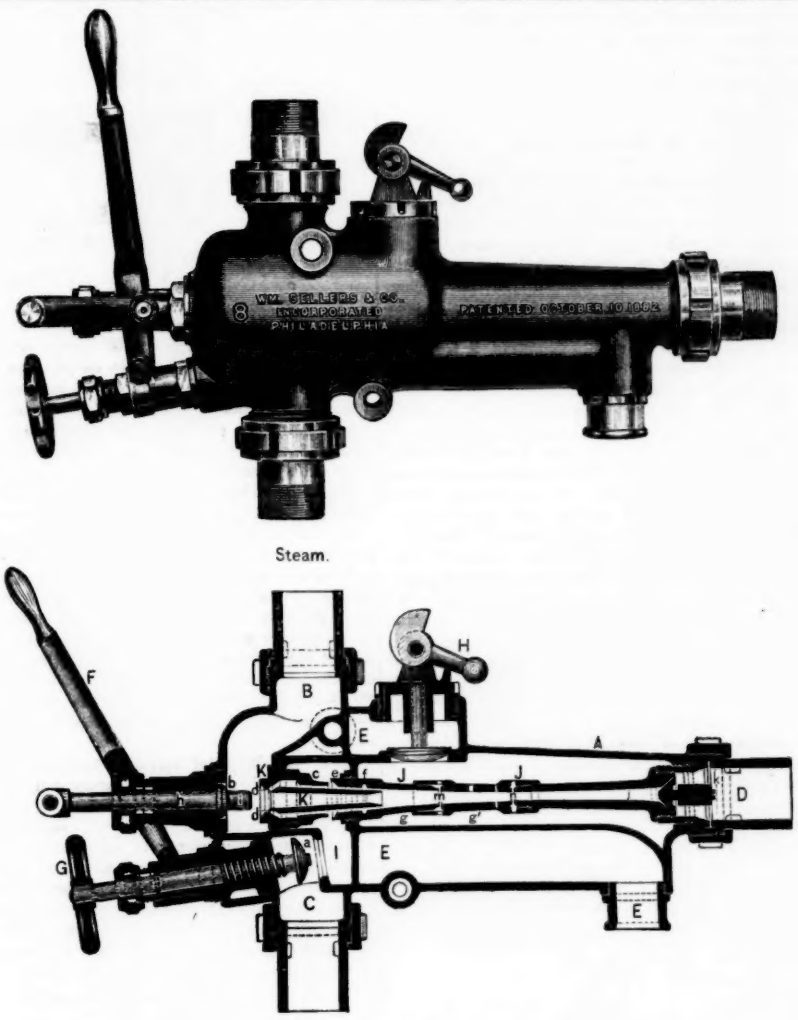
18th, on Philadelphia, Wilmington & Baltimore, near Baltimore, Md., a car in a passenger train was badly damaged by a freight car projecting over the main track from a siding; 2 trainmen and 1 passenger injured.

26th, on Central of Georgia, near Creswell, Ga., engine of accommodation train exploded its boiler, demolishing it completely; fireman injured.

26th, on Missouri Pacific, near Bonnott's Mills, Mo., a car in a freight train loaded with mules caught fire, it is supposed from sparks from the engine, and burned up.

27th, on Louisville & Nashville, near Gallatin, Tenn., a locomotive loaded on a flat car in a freight train struck and knocked down some of the timbers of a tunnel, blocking the track for several hours.

A summary will be found in another column.



SELF-ACTING INJECTOR OF 1887.

Made by WILLIAM SELLERS & CO., *Philadelphia, Pa.*

The Sellers Self-Acting Injector of 1887.

The accompanying engravings represent an improved form of injector lately introduced by Messrs. William Sellers & Co., of Philadelphia.

This injector is especially designed to work on locomotives under the most trying conditions. The makers make the following claims as to this injector:

It will start at the lowest steam pressures with water flowing to it, and will lift the water promptly even when the suction pipe is hot. At 10 lbs. steam pressure it will lift the water 2 ft.; at 30 lbs., 5 ft., and at all ordinary pressures, say 60 lbs. and over, it will lift from 12 to 18 ft.

It is self-acting—that is to say, if from any cause the water or steam, or both, should be temporarily interrupted, it will restart itself when the supply of either or both is resumed. It is capable of doing this down to the lowest steam pressures with water flowing to it, and at 25 lbs. steam pressure and over when lifting the water.

It requires no regulation to work without waste of water for any variation of steam pressure above 40 lbs.

Its range of capacity is over 60 per cent.

It can be used as a heater for the water supply by simply closing the waste valve and pulling out steam lever. Its pipe connections are the same as the Sellers 1876 injector, with which it is consequently interchangeable.

Small particles of dirt, etc., are not liable to interfere with its working, and as its tubes are in a straight line, a wire can readily be passed through them to dislodge an obstruction if necessary. By simply disconnecting the pipe union at the delivery end of the injector the combining and delivery tubes may be taken entirely out.

Its manipulation when lifting the water is extremely simple, as it is started by pulling out the lever and stopped by pushing in the lever. The quantity of water can be regulated with the water valve.

When the water flows to the injector it is, of course, necessary to open the water valve before pulling out the lever, and to close it after pushing in the lever. In starting on high lifts and in lifting hot water it is best to pull out the lever slowly. This injector should always be set horizontally, and may be placed on a locomotive wherever it is most convenient to the engineer.

The construction and operation of the injector may be described as follows:

Referring to the accompanying sectional view it will be seen that this injector consists of a case *A* provided with a steam inlet *B*, a water inlet *C*, an outlet *D* through which the water is conveyed to the boiler, an overflow opening *E*, a lever *F* by which to admit steam, start and stop its working, a hand wheel *G* to regulate the supply of water, and an eccentric lever *H* to close the waste valve when it is desired to make a heater of the injector.

The operation of the injector is as follows:

The water inlet *C* being in communication with the water supply, the valve *a* is opened to allow the water to enter the chamber *I*. Steam is admitted to the chamber *B* and the lever *F* is drawn out to lift the valve *b* from its seat and permit the steam to enter the annular lifting steam nozzle *c* through the holes *d d*. The steam issuing from this nozzle passes through the annular combining tube *e* and escapes from the instrument partly through the overflow opening *f* and partly through the overflow openings provided in the combining tube *g g'* through the overflow chamber *J* and passage *E E*, and produces a strong vacuum in the water chamber *I*, which lifts the water from the source of supply, and the united jet of steam and water is, by reason of its velocity, discharged into the rear of receiving end of the combining tube *g*. The further movement of the lever *F* withdraws the spindle *h* until the steam plug *i* is out of the forcing nozzle *K*, allowing the steam to pass through the forcing nozzle *K* and come in contact with the annular jet of water which is flowing into the combining tube around the nozzle *K*. This jet of water has already considerable velocity, and the forcing steam jet imparts to it the necessary increment of velocity to enable it to enter the boiler through the delivery tube *j* and boiler check *k*. If now from any cause the jet should be broken—say from a failure in the water supply—the steam issuing from the forcing nozzle *K* into the combining tube *g* will escape through the overflows *m* and *n* and intermediate openings with such freedom that the steam which returns through the annular space formed between the nozzle *K* and combining tube *g* and escapes into the overflow chamber through the opening *F*, will not have sufficient volume or force to interfere with the free discharge of the steam issuing from the annular lifting steam nozzle and escaping through the same overflow *F*, and hence the lifting steam jet will always tend to produce a vacuum in the water chamber *I*, which will again lift the water when the supply is renewed,

and the combined annular jet of steam and water will be forced into the combining tube *g* against the feeble current of steam returning, when the jet will again be formed and will enter the boiler as before. In actual practice on a locomotive the movement of the lever *F* in starting the injector is continuous.

Tests of Bearing Metal.

The accompanying engraving represents a machine with which some tests were made recently at the New York Navy Yard as to the relative merits of two well-known bearing metals, Magnolia and Parson's white brass.

The machine consists of the steel shaft in arbor *b*, in the centre of which is fixed the driving pulley *P* for belting. Each end of the arbor terminates in a polished conic frustrum, exactly alike; the diameter at the base of the cone is 1⅛ in., the apex $\frac{3}{16}$, the length of the frustrum is 1$\frac{15}{16}$. The sectional area of the base is one square inch. The metals to be tested were cast into cylindrical plugs and reamed out to suit the spindle cones and marked *a a;* they were properly secured in the chucks *c c*. Oil holes and channels were cut in each plug alike. The chuck in the right is secured to a sliding tail stock *S*, against the end of which presses the bent lever *d*, properly equipped with weights. To prevent any undue strain on the spindle by pull of belting, two steady rests *e e* were firmly bolted to the shears of the lathe, and fitted with guide bearings. Holes were drilled into the plugs to within $\frac{3}{16}$ in. of the friction surface, in which were placed registering thermometers. The spindle was driven by a belt from a countershaft, and made 2,300 revolutions per minute free.

The melting point, as near as could be determined by experiment, is for Magnolia metal 450° Fahr.; for Parson's white brass 460° Fahr. The specific gravity of "Magnolia" is 10.086; for Parson's white brass 7.175.

The machine was run at about about 2,000 revolutions per minute throughout the tests, the results of which are shown in the following table:

	Press. per sq. in. lbs.	Temp. Fahr. deg.	Remarks.
Magnolia	100	103	Parsons' oil holes choked up and oil smoking.
Parsons'	100	280	
Magnolia	150	136	Magnolia smooth and polished surface. Parsons' oil holes filled and oil channels filled with abraded metal.
Parsons'	150	347	
Magnolia	150	120	Result in favor of Magnolia.
Parsons'	150	360	
Magnolia	250	202	Condition good.
Parsons'	250	362	Melted.
Magnolia	732		Head end highly polished and in good condition. Tail end pressure drove cone in beyond oil hole and caused it to fuse.
Magnolia	732	366	
Parsons'	250	316	Head end fused at 316° Tail end good condition.
Parsons'	250		
Magnolia	250	204	Good condition.
Parsons'	250	280	Fused.

All the experiments were conducted on the same two plugs of each metal. It would probably have been better had several different samples been used, so as to eliminate any accidental defects in the mixture or method of casting. The results of the texts, as will be seen, were decidedly in favor of the Magnolia metal.

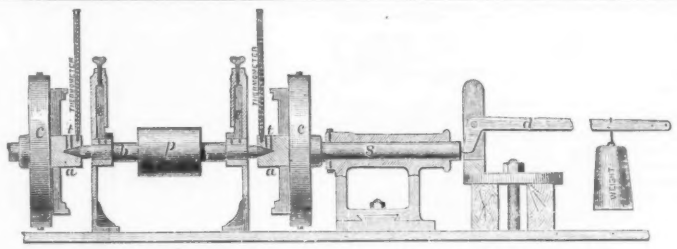
Manganese Steel.

At a late meeting of the Institution of Civil Engineers Mr. Robert A. Hadfield read two papers, one "Manganese in its application to Metallurgy," and the other "Some Novel Properties of Iron and Manganese." He said, in effect: Cast steel, unlike cast iron, cannot be chilled. The addition of sufficient carbon or other bodies to produce the requisite hardness destroys the toughness of the casting, and hardening by the ordinary method of quenching in water or oil is impracticable in the case of many irregular forms produced by steel founders. Iron alloyed with between 2.75 and 7 per cent. of manganese is very brittle, but the addition of between 7 and 20 per cent. of manganese gives a material possessing extraordinary strength and toughness. Bars of about 2½ inches cross section supported on bearings 20 inches apart, one containing 0.37 per cent. of carbon and 4.45 per cent. of manganese, broke with a pressure of 3¾ tons, but with 17 and 20 per cent. of manganese the bars broke at 29½ and 38 tons. Another specimen with 0.48 carbon and 4.9 per cent. of manganese, though exceedingly ductile when hot, could, when cold, be reduced by a hand hammer to fine powder; while a forged and water toughened specimen containing carbon 0.85, manganese 13.75, had a tensile strength of 65 tons and an elongation of 50.7 per cent. Another broke at 69 tons, with 46 per cent. elongation. Experiments showed that the material was applicable to tools, such as axes, razors, chisels, etc.

With 5 to 6 per cent. of manganese the castings were so hard that no tool could face them. With 10 per cent. of manganese the metal was in its softest condition and the hardness increased to 22 per cent., but it was not then as hard as with 5 per cent. After passing 22 per cent. of manganese the cause of hardness became complicated by the presence of greater percentage of carbon, and the metal approached cast iron in its properties.

The toughness of this material was tested by allowing a drop weight to fall on a Browning's coupler casting, which was unbroken though more than 300 foot tons of energy were expended on it. Over an hour was required to drill a half-inch hole three-fourths inch deep in a bar with 14 per cent. manganese, tensile strength 67 tons, though 20 holes of the same size could have been drilled by the same drill in mild steel.

A load of 27 tons per square inch, which would have broken mild steel with an elongation of 30 per cent. on 8 inches, only elongated manganese steel 0.53 per cent. on the same length. An energy of 498 foot tons produced total deflections of only 39½ inches on an axle of manganese steel, whereas on a special steel axle an energy of 348 foot tons produced total deflections of 105¼ inches. Mr. Hadfield claims that "the peculiarly combined toughness, hardnes, and stiffness of manganese steel, either cast or forged, were very clearly brought out by these tests," which showed the material well adapted to resist severe stress before fractures and at the same time show very slight alterations in form.



MACHINE FOR TESTING BEARING METALS.

Used in the U. S. Navy Yard, New York.

Mr. R. Musbet states that it is not steel, but an alloy of iron and manganese, with as small a proportion of carbon as is possible, possessing some of the properties of steel and to a certain extent a substitute for steel, as brass, which is not copper, is a substitute of copper, presents other anomolies than those mentioned above. It is almost entirely non-magnetic. On cooling it has no "afterglow," and a Sheffield firm reports that in rolling a length of 800 feet for wire "the finer it became the more it seemed to retain the heat—in fact, it appeared to gather heat in the process."

Quenching in water increases the stiffness and tensile strength, but the metal is more easily touched by the file. "It has been found, generally speaking, that the higher the heat of the piece treated and the more sudden and rapid the cooling, the higher would be its breaking load and the greater its toughness or elongation." And any change of the grain in this manganese steel from water toughening was rather in the direction of a more open than a closer grain.

The author stated that where his results had been anomalous, as compared with ordinary steel, special care had been taken to thoroughly verify each experiment.

Mr. Fink on Underbilling.

Commissioner Albert Fink, in his letter to Senator Cullom, which we briefly referred to last week, gives some statistics as well as some statements of the considerations bearing on the matter which deserve further mention.

After stating that misrepresentation of weights and of the character of goods has greatly increased since the enactment of the Inter-state Commerce law, and that the railroads have tried to cure the evil, he says: But there are serious difficulties in the way. It has been found impracticable to weigh and inspect all goods offered for shipment. At New York, Chicago, Indianapolis, St. Louis, and other points, something has been accomplished, but only a small portion of the traffic has been attended to. He then went on to particularize, naming the various impediments which are well known and which were alluded to in our report last week of the testimony before the Inter-state Commerce Commission at Chicago. But an important obstacle is that there will always be some one or two roads which will not join their competitors; the latter therefore have to wink at the abuses or go out of business. In advocating the passage of a law making it a misdemeanor for a shipper to misrepresent the character of freight, Mr. Fink says:

Such a law would have a great moral effect with law-abiding citizens. At present, to misrepresent the weight or the character of shipments is, by a great many people, not considered as in any way reprehensible or immoral, but legal condemnation would deter a great many from continuing it. It would have the same effect upon the railroad companies who now for selfish purposes countenance or encourage the practice. It would strengthen the railroads in their voluntary efforts to correct these evils. When misrepresentations are discovered, the railroads can only correct the same to the proper description and classification; but as there is no punishment for the practice, this does not prevent the same parties from making further misrepresentations on other shipments. If the practice were made unlawful, it is not likely that it would be continued. Mr. Fink then refers to the Weighing and Inspection Bureau, which is about to be established at the western termini of the Trunk Lines. He then goes on to recount the work of the New York Inspection Bureau, which has been in operation since 1883. The total tonnage here is only 1,200,000 tons, one four-hundredth of the total tonnage of the country.

During the year 1887 corrections were made at New York in 75,000 cases where shipments were improperly described. Of this number perhaps 20 per cent. were unintentional errors; but about 80 per cent. can be readily traced as intentional misrepresentations.

When the Bureau was first established it was thought that in the course of time and with a knowledge on the part of shippers that a careful inspection is made, the cases of misrepresentation would gradually decrease in number; but the contrary seems to be the case. During the year 1887 the number of corrections was greater than in any previous year. There seems to have been a constant annual increase (1883, 47,573 cases; 1884, 69,461; 1885, 69,571; 1886, 73,091; 1887, 75,643). This is partly accounted for by the fact that the same parties after their misepresentations have been detected, continue the practice, no doubt on the theory that if they succeed in having one shipment out of ten passed without detection, something is gained. It is proper, however, to state that some of these shippers claim that they are personally opposed to these methods, but that they are instructed by the purchasers of the goods to make these misrepresentations, and if they fail to do so their customers threaten to go elsewhere. It is believed that in all such cases a law forbidding the practice would have the desired effect. Many merchants have expressed themselves as opposed to these dishonest practices, and as being in favor of a law making willful misrepresentation a misdemeanor.

Mr. Fink then relates the negotiations between the dry goods men and the railroads in 1886, as a result of which cotton piece goods are taken at lower rates on the execution by the shipper of an agreement warranting correct descriptions. The application to the New York legislature for a law making misrepresentation of goods a misdemeanor, which the merchants and roads agreed upon, was never made because such a law by a single state would be of no value. Mr. Fink continued:

The objection has frequently been made that while a rigid inspection exists in New York city, no inspection is made at Boston and other cities. Efforts have been made to extend this system of inspection to the other cities, in order to put all shippers on the same footing; but those efforts failed on account of the refusal of some of the railroads to have the goods shipped over their road inspected. No fear need be entertained that any one would be punished for unintentional errors, as such cases are easily recognized. If a merchant represents silks as being cotton-piece-goods, or cutlery as nuts and bolts, there can be no doubt that these are intentional misrepresentations; or if a shipper offers a forged receipt from an elevator or warehouse, representing 40,000 lbs. of freight as 25,000 lbs., it is not difficult to prove fraudulent intentions. Neither is there any difficulty on account of complication in the classification, as shippers need not state the class but simply the correct name of the goods which they offer for shipment, and this they certainly ought to be able to do. There is no difficulty in distinguishing between error and fraud, and therefore no fear need be entertained that under such a law innocent parties would suffer. It may be said that the railroad companies arbitrarily establish their tariffs and classifications and that the government should not be called upon to enforce the same. This objection might have been reasonably urged before the enactment of the Inter-state Commerce law, but cannot be urged now. These tariffs and classifications are now subject to the supervision of the Inter-state Commerce Commission, and are on record in the office of the Commission. If they are not reasonable and just, as the law provides, a legal remedy lies within the reach of every shipper. If shippers were allowed at their discretion to violate these official tariffs, how could the provisions of the Inter-state Commerce law that these tariffs are to be strictly adhered to be carried into effect? A violation of the law by the shippers has precisely the same effect as a violation by the carriers, and why should not the shippers be forbidden to violate as well as the carriers? Honest shippers and the honest railroads must have this or some other kind of support in order that the Inter-state Commerce law may be effectually carried out.

The National Lock Washer.

This nut lock, of which we give a cut herewith, has been in use for the last two years on some of the largest railroads of the country, and, it is said, with entire satisfaction to the users. The washer is made of hard, tempered steel, and it will be seen that it has a flange or projecting edge on the face next the nut. When the nut is screwed home this edge imbeds itself in the nut, upsetting the metal and forcing it *progressively* into the thread of the bolt. The nut is thus locked securely in place and will stay there without the pressure of the spring against it. That is, the nut is made fast by jamming, as well as by the principle so successfully applied for many years in the Verona. Although the washer thus becomes a lock independently of the spring, it is by its form a very strong spring. Notwithstanding that the metal of the nut is jammed into the thread of the bolt, the same washer, nut and bolt can be used repeatedly. It merely requires more force to unscrew the nut.

When applied to a joint it presents a broad wearing surface to the angle plate. On the face next the nut there is no wear, as the washer and nut must move together.

It is obvious that this lock can be applied elsewhere than in track. The spring being but an auxiliary means of fastening the nut, the washer may be effective when made thin and light, and therefore it is proposed to use it for carriage nuts, and in a great variety of work. In the last six months this lock has been tried on trucks and cars, instead of jam nuts, with good results.

The washer is made by the National Lock Washer Co. of Newark, N. J.

Planer Tool for Locomotive Driving Boxes, etc.

The accompanying engravings represent a convenient attachment which can be applied to any ordinary planing machine, having a longitudinally moving bed and a vertical adjustable cross head.

Fig. 1 shows the tool as made.

Fig. 2 shows the tool in section.

Fig. 3 shows the tool on a 25-foot planer, planing 32 driving boxes.

Fig. 4 shows enlarged view of the tool on a planer.

The tool is made of a forged bar, heavy and strong, to

withstand the strain to which it is subjected. At the lower end of the bar is a circular enlargement and at the rear of the bar is a groove and a shaft, or spindle, upon which is mounted a gear; at the front of the bar is a face-plate or head, with a vertical guide for the tool carrier. The carrier is made with a vertical adjustment by means of a screw and nut. The gear fastened to the face-plate, or head, is driven by the gear pinion upon the end of a rear shaft, which rests within the groove at the rear of the bar, and gives the rotation of face-plate and tool holder, and can be driven by hand or feed gear wheels.

Supposing it is desired to plane out a number of driving boxes, they should be suitably placed in line and fastened between angle irons to planer bed. The bar, or tool, is then placed in planer tool post and properly secured and adjusted. The planer is then set in motion, and at every stroke of the planer a suitable partial revolution to the shaft may be given and a corresponding movement will be given to the tool, which moves around the centre formed by the spindle, and the entire circular part of the driving boxes by repeated movements of the planer bed, or table, will be planed out. Should the operator prefer, both shoulders of the driving boxes may be squared up before the circular part is begun.

An important advantage arising from the use of this tool is, that a number of boxes may be operated upon at one time, the number being only limited by the length of the planer table, and the work will be found with greater accuracy, which will make the boxes interchangeable. This tool is not confined solely to the planing of driving boxes, but can be, and is, used for performing any work requiring accuracy and the movement in circular form.

It has been found to be much superior to slotting and a saving of 100 per cent.

This tool is in use on the Chicago, Burlington & Quincy Railroad, giving excellent results. At the Aurora shops of that company a 25-ft. planer takes 32 driving boxes at one time. The planing for the cellars and shell bearing is finished complete in 36 hours, at the rate of 24 cents per hour, making the cost of all planing 27 cents per box.

Any further particulars may be obtained of the makers, Messrs. Pedrick & Ayer, Philadelphia.

Fig 1.

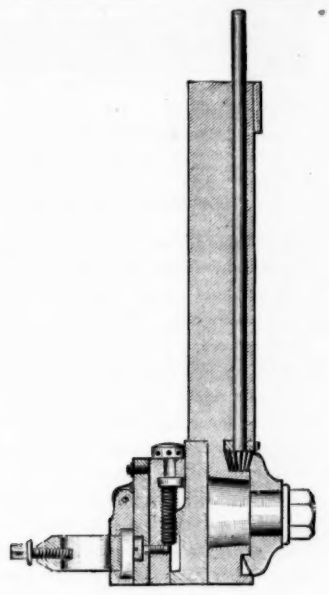


Fig. 2

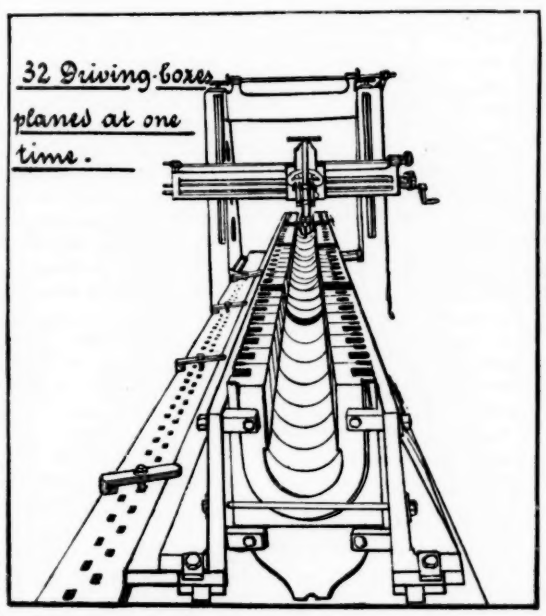


Fig. 3.

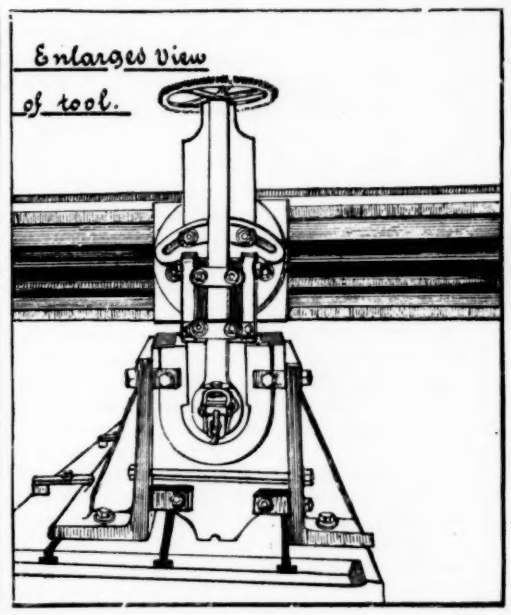


Fig. 4.

PLANER TOOL FOR LOCOMOTIVE DRIVING BOXES AND CURVED SURFACES.

Made by MESSRS. PEDRICK & AYER, *Philadelphia, Pa.*

The Strike.

The Burlington road last week brought suit in the United States Court at Denver against the Union Pacific, Denver & Rio Grande and Denver, Texas & Gulf roads, and sixteen engineers employed by these companies, asking that the roads be enjoined from receiving freight and the engineers enjoined from forming a conspiracy or striking "when requested to do so."

On March 22 the Burlington road applied to Judge Gresham for an injunction against the Chicago, Rock Island & Pacific for refusing freight. The road replied with an elaborate statement, saying that its line and that of the Burlington were really parallel and that therefore the normal interchange of freight between the two was very light; that the Burlington had offered to it for transportation certain cars of freight which should have gone by complainant's own road, and that these shipments were offered and this complaint was instituted for the purpose of precipitating a contest and not in good faith. Furthermore, defendant had, after some negotiation, concluded to comply with the Burlington's request, and had actually given notice to that effect before receipt of notice of this suit. The reply then goes on to state that the several roads in that territory were members of an association; that in January last the Burlington commenced serious reductions of rates, destroying its own and its neighbors' revenue; that the plaintiff would give no reason for this policy until, late in February, it informed the other roads that it purposed continuing the rate war until the roads should agree to enter "an organization such as is generally denominated a trust," to be managed by three men, with power to control rates, make assessments and pay companies for losses incurred by carrying freight at the rates fixed by the trust. It is stated that the Burlington has been unreasonable in its treatment of the strikers; that, if it had pursued a conciliatory course, as other roads had done in similar cases, no strike would have occurred; that, instead of seeking an adjustment it determined to use the disaffection of its own employés to coerce its competitors into the trust scheme, and in furtherance of this purpose delayed answer to the enginemen until it had engaged all the surplus engineers of the country, thus getting the advantage of its competitors in case they should have a strike. The officers of the Rock Island and of the other principal lines having reason to believe that the taking of Burlington freight would make trouble with the engineers resolved to decline to take it until it could be safely done.

On Friday of last week the switchmen—that is, the conductors and brakemen who run with the switching engines in the large yards—suddenly struck at Chicago, Aurora, Burlington, and other places on the Burlington road. No notice was given, and the officers of the road say they know of no reason for the act, though it is generally assumed that there is some understanding between the strikers and the striking engineers. There is no evidence of this, however, and Mr. Arthur denies that his association has any connection with this strike. The road gave notice on Sunday that all of these strikers not returning by 1 p. m. Monday would be discharged. The road secured a few new men at once, but the freight business was on Monday and Tuesday almost at a standstill in Chicago, the large number of private sidings and the extensive territory covered by the tracks of the company rendering it impracticable to prosecute the work to any advantage with inexperienced men. There was a small strike of switchmen on the Chicago, Santa Fe & California in Chicago, but it appears to have been promptly settled. It is said that the men who struck on the Chicago, Burlington & Quincy have hung around the yards and have stolen coupling-pins from trains; entered into disputes with peaceable employés, and committed other lawless acts, such as these men have a reputation for doing. The road engaged a number of detectives and special guards to protect its trains and property. One account says that the reason the switchmen struck was that the new engine runners were reckless; that the switchmen appealed to the Superintendent, on the ground that their lives were in danger, but got no satisfaction. It is said that a considerable number of new men to take the place of the switchmen were brought from the Philadelphia & Reading road, and on Wednesday enough new men were secured, apparently, to insure the defeat of the strikers.

The grievance committee of the Burlington engineers have issued a statement of their case. It says that enginemen who have easy runs have to act as hostler and take care of their engines, so that their work is more nearly equal to that performed by the men on the harder runs than would appear from the statements made by the road. The statement in the road's manifesto, that compliance with the men's demand would involve a large average increase, is, they say, an admission that the present rates are much lower than those paid by neighboring roads, for the statement that the rates demanded by the brotherhood are the same as paid by other roads has not been denied. In regard to classification, the brotherhood demands that men on first year and second year pay shall not be required to run the most important trains. In other words, secondary pay is just, only when applied to runs of secondary importance. The road, it is claimed, places men in their first and second years on the fast and heavy passenger trains. The statement continues:

We have no objection to its paying those who have been a long time on the road any extra gratuity it wishes. But we do insist that one of two things must be true: Either, first, that the engineers are first-class men and entitled to first-class pay; or, second, that the public is deceived when it is asked to travel on trains run by men who are entitled only to second or third-class compensation.

The New York *World* prints the following as from Mr. Arthur:

"We were promised that engineers should be paid as much as on neighboring roads. There was a direct agreement. After a time we showed the management that the agreement had not been kept, and asked for an increase of the standard to that used by nine-tenths of the railroads in the country. The officials curtly refused to keep their agreement. A committee of the engineers then called upon General Manager Stone, and respectfully requested a conference. This was all the answer they got: 'Strike and be damned. I don't care what you do.' I understand that there had been no talk of a strike at that time. The men merely wanted to confer. After getting that answer they sent for Chief Sargent and me. Mr. Stone was more gentlemanly to us, but he positively refused any conference or discussion upon any of the points at issue. He gave us the impression that he courted a strike. We made other attempts to get a conference, but he would not listen to us. What were men to do under such circumstances? The road had broken its agreement in regard to transportation for the engineers to and from their homes. It had broken its agreement to pay what its neighbors were paying. When its men respectfully begged the manager's attention to these things the only answer they got was: Strike and be damned. If there had been a conference we should have been ready to meet the company more than half way in concessions for peace. From the first the managers of the Burlington seemed earnestly determined that the men should strike. * * Not an engineer has weakened or applied for work on other roads, or gone to begging, or fallen into want, or caused any disturbance. We are satisfied with the way things are going; we don't want any other road tied up for our sakes, and we don't want the strike to extend. If we are beaten by the Burlington, and it can run as well as ever without us, all right. We have done what we could to vindicate ourselves, and there will be nothing more to do."

Traction Increaser.

A traction increaser, the Craven Automatic Traction Drawbar, is undergoing trial on the New York, Lake Erie & Western. It is claimed that it is automatic and not under the control of the engineer, and is only brought into use in proportion to the pull of the locomotive. As the engine increases in speed, or completes the ascent of a grade, it is gradually rendered inoperative, and when the engine is running fast or on the more level portions of the road, very little weight is transferred from the tender to the engine. The device is being tried on engine No. 604, one of consolidation locomotives that are somewhat deficient of adhesion on the hind drivers.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The officers of the Chicago, Burlington & Quincy are well satisfied with the engineers that have taken the place of the strikers, and believe that "the road will soon be in better shape than ever before."

In our columns of personal news will be found some brief notes on the life and character of the late Mr. Charles Latimer. It is an inadequate record of a noble life. There were weaknesses in his character, but they were not mean, and only made him the more attractive. His virtues were many, and his life was a shining example for all of us.

The Denver, Fort Worth & Gulf, whose consolidated line has just been completed between Fort Worth, Tex., and Denver, Col., apparently intends to make an energetic effort for through business at the outset, the management having already proposed a freight tariff from the Atlantic seaboard to Denver and other prominent points some 30 per cent. less than the regular overland rates. The rate is by the Morgan and Cromwell line steamers to New Orleans and Texas & Pacific Railroad from New Orleans to Forth Worth. The distance by this route from New Orleans to Denver is about 1,350 miles, as compared with 1,028 from Denver to Chicago and 822 to the Mississippi River by the Burlington & Missouri River road. As the local business of the new road must be light it can doubtless sacrifice profits on it for a long time without losing much money, and the competition will probably be substantially confined to the territory west of Chicago and New Orleans, as those east of there have hitherto had difficulty in meeting either the time or the rates of the steamers to New Orleans. The wholesalers of Chicago and St. Louis will doubtless take a lively interest in the progress of the new scheme, and as the west-bound traffic is much of it of high class, the question of time of transit may very likely be a deciding factor in the case.

The difficulty of deciding upon the adoption of standards applicable to the railroads of the whole country has been much felt in the car coupler question, and there seems every probability that the problem of a uniform coupling for continuous steam heating will also prove an embarrassing question. The difficulty has its origin in the simple fact that it is impossible to make every one think alike. The very fact that there are several excellent couplers in the market simply aggravates the difficulty. If there were but one good coupler, many would doubtless prefer some of the bad ones and others again would wait for another good coupler to come along, just as the Roman countryman who arrived at an unfordable river sat down on the bank and waited for all the water to run past. But such an attitude does not command general respect, and would probably be only adopted by a minority. When, however, there are several undeniably good couplers for steam heating, who shall say which is the best? The members of the Master Car-Builders' Association would add greatly to their laurels, if they would make a careful comparison of their experience with different types of couplers and endeavor to secure the general adoption of what appears to be the best coupler. The traveling public certainly have a right to expect that the next winter will see at least all through and most local trains equipped with apparatus for continuous heating. It is, however, obvious that many railroads will hesitate to equip their cars until they feel certain that the coupling to be ultimately adopted will suit their system of heating as regards position, number and size of pipes, etc.

The first step toward the general adoption of continuous heating must be the general adoption by mutual consent of one particular coupler. Even the owners of the rejected couplers will not greatly lose by this decisive action, for the adoption of one coupler does not imply the adoption of one system of heating, and it is quite possible that many systems will be in increasing demand when their particular couplers are no longer in use.

In this issue we show a new joint now going into use on the New York Central & Hudson River, and also the section of the 80-lb. rail now standard on that road. This section was illustrated in the *Railroad Gazette* Jan. 16, 1885. The Pennsylvania has adopted an 85-lb. rail for the main line between New York and Pittsburgh, the section of which will be shown next week, together with the 34 in. splice-bar used with it. It is interesting to compare the principal dimensions of these two sections, as given in the table below.

	Pennsylvania.	New York Central.
Weight	85	80
Height	5 in.	5 in.
Base	5 "	4 13/16 "
Radius of crown	10 "	12 "
" upper corner	7/16 "	5/16 "
" lower corner	1/8 "	5/32 "
Angle of side	4°	3° (?)
Greatest width of head	2 9/16 in.	2 11/16 in.
Depth of head	1 3/32 "	1 33/64 "
Fishing angles	13°	12° 30′
Least thickness of web	17/32 "	1/2 in.
Radius of web	8"	10 "
Per cent. of total section in head	47	44
" " " web	17	19
" " " flange	36	37

The close agreement of the two sections, in the distribution of metal, and in the most important dimensions will be observed. When they are seen together, however, the comparatively broad and low head of the New York Central rail is noticable. Either section is excellent. They have the height requisite for stiffness, broad and heavy flanges, and the metal in the head well disposed for wear. Notwithstanding the slight slope of the heads, they have ample bearing for the splices. The side angle of the head of the Pennsylvania is reduced, it will be noticed, to 4°, and that is another point gained; in the 67-lb. and 69-lb. sections, it has been 5°. Were we to choose between the two sections we should prefer that of the Central, but it is quite possible that the actual service of the rails, side by side, would prove the choice to be rather fanciful than otherwise. The metal is about as well distributed as it can be without a radical change in the joints, and the great requirements of weight and stiffness are secured. Certainly these sections do not illustrate "the practical tendency of rail standards on the best roads to increase the side angle of the head with the vertical," which one of our correspondents called attention to last week.

It is not to be supposed that the Canadian Pacific will be allowed to indefinitely postpone the building of competing lines to the United States border in the wheat-growing territory of the Northwest; but as we have repeatedly pointed out, that stipulation which has become known as the monopoly clause was part of the contract under which the company built its lines and sold its securities. As a matter of good faith, therefore, the Dominion government is bound to protect the company in its exclusive right to build lines in the belt immediately north of the frontier until the time during which that monopoly was secured to it shall have expired. Eight or ten months ago, it will be remembered, there was talk of building the Red River Valley road in Manitoba by force of arms if necessary, but the duty and determination of the Dominion government were so apparent that the money could not be secured, even on the guarantee of the province. How much of the agitation in Manitoba was the result of legitimate or respectable motives and how much was worked up by mercenary adventurers cannot be estimated, but the later developments indicate that it was partly a speculation. One result of the agitation, however, is a wide-spread belief that the monopoly of the through business to and from the Canadian Northwest cannot be preserved to the Canadian Pacific without endless trouble and some danger. Geographically and commercially the people of Manitoba are much closer to the United States than to Canada. From Winnipeg to St. Paul is a little over 400 miles, while to Montreal it is over 1,400. It is wise, therefore, not to intensify the feeling of dissatisfaction with the federal arrangement, which is already somewhat serious.

Now the Dominion government is said to contemplate the purchase of a release from the monopoly clause of the Canadian Pacific contract, and Canadian journals put the probable price at $20,000,000. Later dispatches state that this figure is much exaggerated, and it does not appear that the negotiations have yet so far advanced that the cost to the Dominion of nullifying the monopoly clause can yet be known. But the money to be paid is not the only difficulty in the way of the rearrangement. With competitive lines across the border much of the trade with the Canadian Northwest must be diverted to the United States. St. Paul and Minneapolis are not only great trading centres, but they are becoming important manufacturing towns as well, and with unrestricted access to those markets the Manitobians and the people of the future farms and towns in the Saskatchewan country will naturally buy and sell there. This consideration will perhaps weigh as much against the proposed settlement as will the payment of a round sum in cash. On the other hand, a very little rebellion in Manitoba would cost $20,000,000, and it is certain that the growth in population and wealth of these Northwestern provinces would be immensely advanced by easy communication with their neighbors in the United States. The stream of colonization would flow naturally and uninterruptedly forward from Minnesota, Dakota and Montana, whereas at present it must leap across the great wilderness north of Lake Superior. The loss of trade to Eastern Canada by opening easy communication with the United States would doubtless be far more than offset by the development of distant provinces. If the monopoly rights of the Canadian Pacific are surrendered, and if the government secures the enactment of a general railroad law, construction in the Dominion will naturally be considerably stimulated.

The Wear of Tires.

The recent discussions on this subject at the Western Railroad Club have brought out facts and figures which appear to show pretty clearly that a thick tire will not wear as well as a thin tire, and that an increase in the thickness of locomotive tires does not proportionately increase their life. The probable reason is simple, and must be sought in the mechanical texture rather than the chemical composition of the steel. The wearing qualities of steel depend largely upon the density of the metal. Density, or close adherence of the atoms can only be obtained by "putting plenty of work" into the tire or rail. In other words, the process of rolling or hammering the ingot or bloom into the finished article must imply a material change of form, a great reduction of cross section, and a corresponding increase in length. The pressure in hammering, cogging or rolling must penetrate to the very centre of the mass, so that every atom is forced into the closest possible contact with its neighbors. It is perfectly possible to cast a steel ring nearly the size and shape of the finished tire and then enlarge it slightly by passing it through the rolls. Such a process does not require powerful rolls, and is comparatively cheap and easy, but it need hardly be said that it will produce poor tires. A close grained dense steel that will wear well can only be produced by heavy pressures which can give considerable reduction of cross section at one heat. It is evident that with tires of similar diameter the process of rolling gradually reduces the diameter of the tire. If the tire is to be 4 in. thick, the process is stopped sooner than if the tire is to be rolled down to 3 in. thick. The thick tire is consequently insufficiently worked and is comparatively spongy, and gives poor results in wear.

Steel can also be condensed and strengthened by pressure during the process of casting. Whitworth steel, the strongest material known, is subjected to an enormous pressure while in a molten state. The process, however, involves very expensive plant, and the

product is only used where cost is a secondary consideration. Another method of casting under pressure is that used by Mr. Webb in casting the bodies of steel-tired wheels. The metal is poured in at the centre of a revolving mold, and consequently the centrifugal force of a fluid eight times as heavy as water puts a considerable pressure upon the metal near the periphery of the wheel. A similar process for casting steel wheels has just been inaugurated here. In the latter, however, the tread is solid with the body of the wheel, and therefore the part corresponding to the tire is not only cast under pressure, but is further condensed by rolling.

It is obvious that casting under pressurehas its limitations, and that the centrifugal method is only applicable to articles of certain form. It may be taken for granted that in making tires the centrifugal method of casting will not altogether supersede rolling, and it remains an open question whether a combination of the two processes would secure a better tire than the single process of rolling. A ring cast in a revolving mold would require to be finished in a tire mill, and thus the expense of a double process would have to be incurred. It might, however, be worth while to try this method of obtaining a thick tire which would wear as well in proportion to its thickness as a thin tire.

The discussions at the Western Railroad Club have also brought out the fact that tires wear fastest just after being turned. This is not surprising, as with the heavy cuts used in turning tires, the surface of the steel is somewhat injured, and is therefore sooner ground and worn away. This is one argument in favor of grinding instead of turning tires. The former process leaves a smooth and uninjured surface, which apparently does wear better than the rough and torn surface left by the ordinary process of turning. Grinding steel-tired wheels has, however, never become a prevalent practice, probably because it is a dirty, disagreeable and unhealthy process, requiring considerable skill, while the dust and grit from the stones injure any neighboring machine tools. Consequently the grindstones should be placed in a separate shop, which is often inconvenient. It is possible that the substitution of emery wheels for grindstones would lessen these evils, but the price of steel is now so low that the cheapest and simplest process of truing tires will probably retain its position, even though it may be somewhat wasteful of steel.

Cross Ties.

In another column will be found a communication calling attention to the rapid destruction of tie timber and suggesting metal ties as a remedy. The estimate by Sound Sleeper of the yearly consumption of timber is useful principally as giving an impressive picture of its magnitude; therefore it is not worth while to endeavor to get very accurate figures, but simply to know whether or not they are grossly exaggerated. In a recent publication of the Department of Agriculture the whole trackage is taken at 187,500 miles, 25 per cent. being added to the reported 150,000 miles of road for double track and sidings. Estimating 2,640 ties to the mile, this gives 495 million ties in the track, and supposing one seventh to be renewed every year, the yearly consumption for renewals is 70,700,000 ties, against 74,500,000 as estimated by Sound Sleeper. The estimate of the department of the consumption for renewals and for an average of 5,000 miles per year of new construction is about 84 million ties, which at 300 ties to the acre would clear 280,000 acres of land every year. Probably the estimate of 500,000 acres is quite as accurate, for 300 ties per acre is doubtless a high average. The amount of good tie timber which can be cut from an acre of land is so extremely variable that nothing better than a very rough approximation can be made to the acreage of timber annually required for that supply. In the Government report of which we speak, although 280,000 acres is taken as a possible approximation, the writer of the report adds that "if the frequent estimate of 100 ties to the acre be taken, the area drawn upon annually will be 839,142 acres."

In the same report Mr. M. G. Kern, the agent of the department, estimates the entire area of timber land required to supply the railroads with ties, telegraph poles, dimension timber and lumber at 297,000 acres a year. His estimate of the life of ties is based upon replies received to a circular sent out to railroad companies. Answers were received from 35 companies, operating 46,000 miles of track, including some of the great systems, and some of the most painstaking and scientific observers. The average life of ties determined from the replies is 7.2 years.

We have not attempted to verify the other figures of timber consumption given in Sound Sleeper's letter. If he wishes to prove to railroad officers that they should adopt metal ties he has begun in the wrong way. It is of no use to try to scare them by figures showing the rapid destruction of our forests. They will admit that it is deplorable, that immense areas are yearly denuded of the choicest young timber for ties, and that, sooner or later, wooden ties will be harder to get and prices higher than they now are. But most railroad managers are obliged to think first of expense of maintenance and operation to-day, and can only give secondary consideration to what the conditions may be at some indefinite but more or less remote future time. Therefore, Sound Sleeper must prove to them, by well-digested and convincing figures, that the sum of the annual charges for interest, maintenance and repairs will be less with steel or iron than with wooden ties before he can make much headway. The wooden tie is, when in its perfect condition, about the best thing for its purposes that could be contrived. It is elastic, distributes its load well over the roadbed, involves the least possible number of parts, and is convenient in construction work and in track repairs beyond anything else ever used. It seems probable, therefore, that the first great step taken by the roads generally toward providing for the future supply of ties will be in the preservative treatment of timber rather than in the adoption of metal ties. The life of the tie is affected to a considerable degree by the stiffness of the rail, and one means of economizing ties is to use stiffer rail sections. It is encouraging to know that in both directions—the chemical treatment of timber and the adoption of heavier and stiffer sections—considerable progress is making.

It is very desirable, however, to have thorough trials made with metal ties on American roads. Actual experience only can demonstrate their economy, and data, drawn from experiment, by which we can compare the relative cost and service of wooden ties and iron or steel are unfortunately meagre, and are mostly obtainable only from foreign roads where the conditions are different from those found here. The European advocates of steel ties have claimed that there is economy not only in final cost of ties and maintenance, but in the labor of keeping the track in line and surface, although this has not been proved by any figures that we have seen.

An American Railroad Union.

Under the above title the *Railroad and Engineering Journal*, whose editor, Mr. Forney, is doubtless as well posted as any one concerning the railroad technical organizations of this country, recently had an editorial discussing the question of consolidating the Time Convention, the Master Car Builders', Master Mechanics' and Roadmasters' Associations, and perhaps others, into one grand body. This proposition has been put forward at various times, more especially by correspondents in the *Railroad Gazette* of Oct. 28 and Nov. 4 last; and it was given a definite shape by the appointment of a committee at the last (October) Time Convention to consider matters referred to the Convention by the Superintendent's Association and to take up the relations of the Convention to other associations generally. We cannot learn that this committee has taken any steps towards recommending any action by the convention.

Mr. Forney discusses the value of the principle of division of labor, and the growth of businesses and arts confined to narrow specialties. This has come to necessitate organization and association among workers for the purpose of accomplishing definite and common ends. While, therefore, railroad arts have necessarily been sub-divided, co-operation has become necessary to secure the best results from this division of work, and the various associations have grown up. The idea now under consideration simply proposes still further unification of plan. Mr. Forney continues:

> No very distinct scheme of organization has been proposed. The members of the Time Convention outrank those of the other associations. That fact raises the question whether the other associations will occupy a subordinate relation or whether they shall have co-ordinate rank and authority somewhat like that of a house of representatives to a senate, or whether the various associations should be consolidated, and then be divided into sections, somewhat like the American Association for the Advancement of Science, the different sections being devoted to the consideration of separate classes of subjects, such as locomotives, cars, road-bed, passenger and freight traffic, accounts, etc. With any form of organization the question will present itself whether concurrent action of the Time Convention and the other associations should be required. Should all measures of importance originating in the various associations be referred to the Time Convention for approval before being finally adopted? The danger of that would be that it might retard all action to such an extent as to make it impossible or very difficult to do anything. The rules of the Car-Builders' Association require that the adoption of all standards shall be referred to a letter-ballot for decision. This practically brings the most important action of that Association before the general managers and general superintendents for revision, because their representatives, it may be supposed, would consult their managers or superintendents before voting. A very simple way of bringing about what has been suggested would be to refer all matters of importance to the Time Convention, to be submitted to letter-ballot by that body. Such measures would be discussed by the Time Convention, and, possibly, referred back to the association in which they originated, with recommendations for amendment. Measures which were first brought up in the Time Convention which relate to cars would naturally be referred to the Car-Builders' Association, or, if they related to locomotives, to the Master Mechanics', and similarly with action relating to other departments. After being discussed and modified, possibly, they would go back to the Time Convention for final submission to letter-ballot.
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> A simple amendment to the constitutions of the different associations and the appointment of committees of conference is all that would be required to bring about the co-operation that has been outlined. Whether such co-operation would be desirable may be considered an open question. The name of the Time Convention should be changed. "The American Railroad Union" has been proposed. * *
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> The constitution of the Time Convention says that "memberships shall be by companies * * * which may be represented by their President, Vice-President, General Manager and General Superintendent, or by any official or officials connected with the transportation or traffic department." The danger is that the officers named will not be able or disposed to give the time to the meetings which will be required to act intelligently on such subjects as would come before them if direct relations were established with the other associations. It would seem to be a better plan to allow the President, General Manager or General Superintendent to appoint a representative member in the association, as is now the practice in the Master Car-Builders' Association. If they are not able to attend the meeting themselves such officers could select the ablest persons on their staffs to represent their companies. The whole subject is a very important one, and worthy of full discussion.

The principal thing to be noted in the above is its cautious tone; and a little reading between the lines seems to indicate that the plan is regarded as impracticable in some respects. Other men of large experience doubtless agree with Mr. Forney in this view. They have canvassed the general subject in former years, and see no fewer obstacles now than then. Some one or few individuals of great energy and resources would have to do an enormous amount of pushing to keep the thing running. The placing of all the machinery in working order would have to be supplemented by a strong and constant force to overcome the obstacles of poor lubricants, the chilly blasts of indifference occasionally arising, and other things. Even so important and useful an organization as that of which Mr. Fink is the head is only kept in easy working order by a powerful force and by the fact that its concerns occasionally arise to commanding importance. When thousands of dollars are being wasted daily by cutting rates, attention *must* be paid to the matter. Questions which are subordinate to these chief concerns have to wait indefinitely, although they are in themselves of really great importance.

Perhaps the most definite point that it is now desirable to compass is to get superintendents and general managers to take a lively and intelligent interest in the important affairs of their subordinates. There is much complaint that a master mechanic, for instance, may go to a convention, get important new ideas and return home with enthusiasm, but fail to enlist the sympathy (and the money) which should be forthcoming from his superior. Anything, the transformation of associations or anything else, that would accomplish this would be a distinct advance. Those higher officers who now take an active interest in car building, car service, uniform couplers, economy of fuel and other technical topics are, as a rule, either technical men themselves or those who have consulted with their heads of departments more freely than is common.

An awakening of a general interest among higher officers on these questions would soon produce discussions in the higher association, which very likely would lead to the inception in that body of important schemes to be handed down to the other organizations to be worked out in detail. The General Time Convention has been transformed during the last three or four years from a useless body to a very useful one, and it is greatly to be desired that the movement be continued and intensified.

The principle of allowing each road to vote in proportion to its size on important questions, as is carried out in the Master Car Builders' Association in the rule allowing an additional vote for each 1,000 cars owned, is an important point to be considered. This change greatly strengthened that Association, and in fact the feature may now be regarded as a vital element in it. If this principle could be practically recognized in the work of a general managers' or a consolidated association an important cohesive element would be gained and perhaps an important advance be made possible.

February Accidents.

Our record of train accidents in February, given in this number, includes 57 collisions, 104 derailments and 13 other accidents; a total of 174 accidents, in which 28 persons were killed and 164 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	30	
Butting	21	
Crossing	6	
		— 57
DERAILMENTS:		
Broken rail	12	
Loose or spread rail	3	
Broken bridge	3	
Defective switch	2	
Broken frog	2	
Broken wheel	8	
Broken axle	6	
Broken truck	4	
Broken car	1	
Broken brake-chain	1	
Misplaced switch	4	
Runaway train	4	
Bad switching	2	
Cattle on track	2	
Snow and ice	2	
Landslide	2	
Washout	3	
Accidental obstruction	1	
Malicious obstruction	1	
Unexplained	41	
		—104
OTHER ACCIDENTS:		
Cars burned while running	2	
Boiler explosion	2	
Broken parallel rod	4	
Broken axle	1	
Broken tire	1	
Broken wheel	1	
Miscellaneous	2	
		— 13
Total number of accidents		174

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing.	Total.
Trains breaking in two	2	..	..	2
Misplaced switch	2	1	..	3
Failure to give or observe signal	2	..	..	2
Mistake in giving or understanding orders	..	1	..	1
Maliciousness	2	..	..	2
Miscellaneous	9	3	3	15
Unexplained	13	16	3	32
Total	30	21	6	57

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	22	..	22	13
Defects of equipment.	2	20	9	31	18
Negligence in operating	21	10	..	31	18
Unforeseen obstructions	2	11	..	13	07
Miscellaneous	..	..	4	4	..
Unexplained	32	41	..	73	44
Total	57	104	13	174	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c
Passenger	26	35	9	70	31
Freight and other	80	69	4	153	69
Total	106	104	13	223	100

The casualties may be divided as follows:

KILLED:	Collisions.	Derailments.	Other.	Total.	P. c.
Employés	10	9	2	21	75
Passengers	2	2	..	4	14
Others	..	3	..	3	11
Total	12	14	2	28	100
INJURED:					
Employés	37	56	6	99	60
Passengers	17	47	1	65	40
Others	..	..	..	..	..
Total	54	103	7	164	100

Twenty-three accidents caused the death of one or more persons, and 41 caused injury but not death, leaving 110 (61 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with February, 1887, shows:

	1888.	1887.
Rear collisions	30	24
Butting "	21	31
Crossing "	6	2
Derailments	104	67
Other accidents	13	8
Total "	174	132
Employés killed	21	21
Others "	7	34
Employés injured	99	51
Others "	65	55
Pass. trains involved	70	54
Average per day:		
Accidents	5.93	4.71
Killed	0.97	1.96
Injured	5.66	3.78
Average per accident:		
Killed	0.162	0.417
Injured	0.953	0.803

There is a gratifying decrease in all the essential points from the totals given for January; but January was a very bad month, and when we come to compare with February last year we find no special comfort except in the reduction of passengers killed. But this satisfaction is destined to be short-lived, as the record for March has already shown. Startling disasters are now so frequent that one is forced to conclude that the comparative immunity from them previous to 1887 was really an exceptional condition, and not the normal state nor anything like it. This view is borne out by the fact that most of the recent great disasters have resulted from well-known causes which all railroad officers have been warned against, and which many of the most careful of them have spent large amounts of money to provide against.

One of the curious accidents of the month was the slight collision on the Old Colony caused by a red glass being forced out of its position by the jarring of the train. The incident emphasizes the inconvenience, not to say danger, of employing white as a signal color at night. Switch lights should always be colored, as lights in houses adjoining the railroad and in other places are a constant annoyance to cautious enginemen. The writer vividly remembers once escaping a rear collision by only a few feet by reason of the runner mistaking a street light for an all-clear signal. In semaphore signals where two or more lights indicate safety by their *position*, white is not so objectionable; but the principle in all fixed signals should be to have "all clear" indicated in the most positive manner, especially where fast trains are run. An engineman who has but a second or two in which to make up his mind whether to shut off steam or not, wants to not only discover the *absence* of red but the *presence* of something that gives him encouragement to go on; and a colored light, being more distinctive, gives this assurance more quickly than a white light can.

Other unusual accidents were the escape of a train from control by the breaking of a single brake chain, and the derailment of a passenger train by a switch which was properly thrown but not fastened. These are dangers which have to be constantly guarded against, and it is well to note that even in such apparently little details, carefulness is not wasted. Our single tire failure affords a ludicrous comparison with the complete reports gathered in Great Britain. The collision at Colton, Neb., on the 24th, illustrates again the special dangers of oil transportation, some $40,000 worth of property being burned up as the result of a moderate collision. One of the specially reckless cases of the month was the collision at Newburgh, N. Y., on the 8th, where an engine and caboose backing through a yard to get to their train ran into the rear of a passenger train standing at the station. Two men in the caboose were killed. The engineman is reported to have been a new one and the coroner's jury censured the road for lack of discipline.

The collision on the morning of the 1st in the Weehawken tunnel, where an absolute block system is supposed to be in force, would seem to be quite a brilliant exhibition of "modern railroading." The rule requiring the constant presence of a man on the rear car of a train as well as that requiring a block signal operator to see the tail signal before giving "all clear" must have been violated, and apparently the red tail lights were not so effective as they should have been.

In a collision in which two men were killed, at Hamilton, Ont., Feb. 16, the conductor moved a freight train from a branch on to the main line without examining the train register, and almost immediately met a passenger train. Other men who should have detected the wrong move seem to have depended on the conductor's infallibility, though the collision occurred within a few rods of the junction almost before the switchtenders and others had had time to collect their thoughts. The form of train order on which the freight conductor moved would seem to be a temptation to carelessness under some circumstances. It begins with the formula, "All trains due have arrived;" this not only distinctly relieves the conductor and engineman from examining the register, but also opens a chance for a mistake in calculating time. At the time this order was given, the passenger train which was run into was not due, but at the time the order was read it *was* due; great care would seem to be necessary on the part of conductors in acting on such orders.

The Fastest Train in England.

Some of the express trains running between London and Manchester by the Great Northern route are the fastest trains now run in England and are probably the fastest regular trains in the world, covering, as they do, 203½ miles in 4 hours 15 minutes, including stoppages. These trains run without stopping between London and Grantham, 105¼ miles in 1 hour 57 minutes, an average running speed of 54 miles per hour.

The type of engine used for running these and other fast trains on this line have been in use for many years, and one which contained some improvements was exhibited at the Newcastle-on-Tyne Exhibition last year, and hence this class have been termed the "Jubilees," just as engines under other circumstances have been termed "Stem-winders," "Ironclads," "Floating Batteries," and even plain "Hogs" or ungainly "Camels."

The "Jubilees" have a single pair of drivers 8 ft. 2 in. diameter on tread and outside connected cylinders, 18 in. diameter by 28 in. stroke. The front end of the engine is carried on a four-wheel truck with cylindrical centre pin placed slightly nearer the rear than the front wheels of the truck. The hind end of the engine is carried on a pair of 55 in. trailing wheels, while the tender and truck wheels are 48 in. diameter over tread. The boiler has no dome and the throttle valve is a slide valve placed in the smoke-box and communicating with a dry pipe running the entire length of the boiler. The fire-box crown is slightly rounded and secured by direct stays and the grate is inclined. The engine weighs 101,000 lbs. in working order. The weight on the drivers is no less than 40,300 lbs. The rails, however, weigh about 90 lbs. per yard and rest on chairs weighing about 50 lbs. each. This class of engine is justly a favorite and was first built nearly 20 years ago. Since then the diameter of the boiler has been increased, flues 1¾ in. outside diameter have been substituted for 1⅞ in. flues and the axles, tires and principal working parts have been strengthened, increasing the weight of the engine about 17 per cent.

The London *Engineer* contains some particulars of a recent trip on one of these engines. The train on this occasion consisted of six "carriages," the usual load, and two "saloons" or private cars. The whole train, including engine and tender, weighed about 420,000 lbs.

On the run between Grantham and London, referred to above, schedule time being kept, one mile was run in 46 seconds, two others in 47 seconds each, and another in 50 seconds, or equivalent to 78.3, 76.6, and 72 miles per hour respectively. These speeds were attained on down grades of 26 ft. per mile. The first 24 miles was run in 22 minutes, and the first 55 miles in one hour, up grades and slackening through important station yards reducing the average. The coal consumption is stated to be about 22 lbs. per mile, equal to 1.7 oz. per mile per net ton weight of the train including engine and tender. The extremely small consumption of fuel is more astonishing than the speed, and the whole performance does great credit alike to the design of the engine, the skill and care of the runners and firemen and the smoothness of the permanent way. These essential requisites for the attainment of high speed would, however, be rendered useless were not the line thoroughly equipped with the block system, interlocking and clearly visible signals. Without these safeguards, no cautious man could venture to run at these speeds on a crowded line, on which in years gone by an imperfect signal has meant death and disaster.

The Trunk Line special committee on car service has made some modifications in the rules for the guidance of the roads settling on the per diem basis, to meet various objections and criticisms that have arisen, and they now read as follows:

Rules 1, 2, 3 same as before. 4. Days to be counted midnight to midnight. Day of receipt not to be counted, day of return to be counted. 5, 6, no change.

7. Co-operative line cars, owned and controlled by railroads, shall be subject to the mileage and per diem charge at above rates; all reports connected therewith shall be made and the revenue therefrom accounted for as may be directed by the railroad company whose name or initials appear on the cars; but car service on cars owned by individuals, firms or private companies shall continue to be settled for on a mileage basis.

8. The total amount of per diem charges shall be computed at the end of each calendar month, and a report by car numbers, of the amount due each road (showing the number of days for each car, including the cars on hand at midnight of the last day of the month) shall be sent to the proper officer as per Rule 7, *as promptly after the close of each month as possible.* The aggregate number of days with the amount of the per diem charges to be added to the regular mileage report for settlement. The old form of junction report will be sent daily as under the straight mileage system.

9. Reports to the car record office of cars interchanged at junction points shall be signed by the agent or other authorized representative of both roads, the receipt of cars delivered being thereby acknowledged.

10. The delivery of cars at an interchange point shall be considered to be effected, either when such cars have been actually placed on a designated and recognized delivery track, or if such track or tracks be full, when the road offering the cars has placed them on the nearest available adjacent tracks, and has notified the receiving road that such cars (giving the initials and number of each car) are placed and ready for delivery. *Provided*, That the road offering the cars and serving such notice shall place such cars on the recognized delivery track within five hours after receiving notice from the receiving road that the delivery track is clear; and, *Provided further*, That proper billing for such cars shall be delivered with or in advance of such cars.

11. Whenever a railroad company gives notice to its connections that for any reason it cannot receive any specified traffic or empty foreign cars, such notice shall not be made to apply to shipments already in transit, or that may be billed within 24 hours of the time of such notice.

Railroad companies shall at all times receive their own empty cars and empty foreign cars that have to pass over their road homeward.

The Burlington, Cedar Rapids & Northern had complained at the per diem charge on cars sent from the East to await lading, but the committee took the ground that delays in the East are, in the long run, as great as in the West, and that roads could refuse empty cars if they deemed best. The final action of the Committee as embodied in Rule 11 does not, however, provide an adequate remedy, we fear. If an Eastern road desired to get rid of 100 of its own cars a month before the time at which they would be wanted in Iowa for grain, it would quite likely try to load them with small loads (so as to get rid of the maximum number of cars in the minimum time) for points on the roads which would be likely to use them. The average time of a trip from the seaboard being nearly or quite a week, the western road would either have to give its notice seven or eight days in advance or else return the cars eastward immediately after receiving them. The latter would involve transferring the goods at the point of receipt or else unnecessary empty mileage.

A statement has recently made the rounds of the press to the effect that the Atlantic terminus of the Canadian Pacific has been definitely fixed at St. Andrews, N. B., and that numerous important purchases of land have already been made there in which Canadian officials have been interested. We are informed that these land purchases are entirely a private speculation. The town has some advantages as a summer resort, and the purchases have been made with a view to laying out sightly building lots and increasing the importance of St. Andrews as a seaside resort. The land so purchased is mainly from 40 to 80 ft. above high water mark, and entirely unadapted for use as a railroad terminus.

The intention of the Canadian Pacific with regard to its Atlantic terminus remains still unknown. The "Short Line" across the state of Maine extends from the western boundary near Lake Megnatic to a junction with the Maine Central at Mattawamkeag, 58 miles northeast of Bangor, and it is generally supposed that the Canadian Pacific has made a traffic agreement with the Maine Central, under which it will work over the latter company's line between Mattawamkeag and Vanceboro, the junction of the Maine Central and the New Brunswick systems. In fact, the last annual report states that "permanent trackage rights have been secured" over the Maine Central. No charter exists

under which the Canadian Pacific may build east of Mattawamkeag in Maine, and whatever the intention of the company may be, it is at least premature to say that St. Andrews has been selected as the terminus on the Atlantic.

In the course of some remarks at the annual banquet of the Business Men's Association of Joliet, Mr. Stirling, the Treasurer of the Joliet Steel Co., stated that each ton of steel rails produced consumes 4⅔ tons of raw material, which is moved an average distance of 412 miles, at a cost for transportation of $2.04 per ton, or $9.52 per ton of rails made. He further called attention to the facts that in 1870 the coal and iron freights on the Lake Shore & Michigan Southern amounted to 15.25 per cent. of a total of less than 3,000,000 tons, while in 1886 this class of freights was 35.25 per cent. of 8¼ million tons, with only 28 per cent. of agricultural products, merchandise having increased from 15¾ to 19¾ per cent. during that time. On Mr. Stirling's basis, the 2,049,638 gross tons of rails made in this country last year required the transportation of nearly 10¾ million tons of freight, giving 4,413 million ton miles. As Chicago and Joliet pay less for hauling the raw materials for steel making than Pittsburgh and Johnstown, according to Mr. Carnegie, and as they make more tons of rails, the ton mileage estimated above may be considered approximately correct. The product in steel rails, allowing 115 tons of pig iron for 100 tons of steel rails, accounts for over 2½ million tons out of our last year's make of 6,417,148 gross tons of pig iron. If the same amount of raw material is allowed per ton for the balance of our production of pig, we have over 22 million tons, and allowing an average haul of 250 miles on this amount we have an aggregate freight movement of ten thousand million ton miles on the raw material for this industry, or about 19 per cent. of the ton mileage of 1883. That of 1887 is not yet available. These figures give some notion of the immense importance of the steel and iron industries, not alone in the machinery of transportation which they supply, but in the employment which they give to that machinery. It is asserted that the 4,000,000 tons of iron ore mined in the Lake Superior district last year required an expenditure of $16,000,000 for miners' wages and freight charges. And now ore is being shipped by railroad from the Vermillion mines through Two Harbors and Duluth to either Chicago or Joliet for $2.50 per ton. The distance from Tower, the shipping station of the Vermillion mines, to Chicago is 646 miles. The rate per ton-mile is therefore less than four mills.

The battle of the gauges which has resulted in this, as in most other countries, in the defeat of the narrow gauge and the general adoption of the standard gauge, is, it appears, still undecided in India. If the following extract from the *Indian Engineer* is a fair specimen of the arguments used, the narrow gauge even in India must be sorely pushed for valid reasons for its continued existence :

"The advantages of a 2-ft. gauge are that it costs very much less than a broad gauge for permanent way and rolling stock, that it can go round curves of 100 ft. radius, and up and down gradients of 1 in 30 (176 ft. per mile), whereas broad gauge lines need curves of 2,500 ft. radius (2¼ deg.), and gradients of not more than 1 in 100 (53 ft. per mile), and that for a very short distance." The article further states that a speed of 10 miles per hour is the maximum for the 2-ft. gauge.

As regards gradients many most important standard gauge lines have grades considerably steeper than 176 ft. per mile, and are worked more easily than on the narrower gauge, chiefly because the standard gauge gives greater facilities for a powerful and durable locomotive. These truisms seem insufficiently appreciated in the article above quoted which goes to say : "The rails required for the permanent way for level country should not be less than 25 lbs. to the yard. If the gradients are heavy, and heavy locomotives are required to run over the line, then on the level portions rails of 30 lbs. to the yard, and on the stiff gradients rails of 40 lbs. to the yard are required. It is waste of money putting down lighter rails, as the rails only bend between the sleepers, and give the engine a continual up hill draw."

The absurdity of the concluding words needs no comment while it is now generally conceded that, with the present low price of steel, the use of rails lighter than 40 lbs per yard is false economy.

It is evident that, while the curves and grades named are desirable, though not essential, for a first-class standard or broad gauge line, where very high speeds are to be attained and very heavy loads are to be hauled, that very much steeper gradients and sharper curves can be used on the standard gauge if the speeds and loads of the narrow gauge are adhered to. The regular use of curves of 100 ft. radius is exceptional, because so sharp a curvature is seldom required, but it is perfectly possible to work such curves regularly on the standard gauge, as has been done for years on the New York elevated. A suitable arrangement of guard rails effectually prevents derailment or accident. The rigid wheel-base of the engines and cars must be short, and some special arrangement of draw-gear may be necessary for long passenger cars.

The New York Central's experience with steam car-heating during the blizzard week was such as to convince its officers that stoves or auxiliary heaters are unnecessary in stalled trains. Early on Monday, Mr. Toucey's general order was sent to all engineers to bucket snow into the tenders to keep them supplied with water. The result of this timely warning was that they did not have a dead engine on the road. Between Grand Central Station and Spuyten Duyvil, five trains equipped with the Martin system of continuous heating were stalled from Monday to Wednesday morning. The engineer of one of these trains, near McComb's Dam, cut loose in order to try "bucking" the drifts, and was unable to get back to his train for from two to three hours, and meantime the heat in the cars ran low, although no severe suffering was caused. In all the other trains the temperature was uniformly maintained at about 65 degrees. A passenger on the Tarrytown train writes: "At about 8 o'clock in the evening the engineer came into the coaches and said to the passengers: 'I have got a foot and a half of water in the tender; I think I can, with care, make you all comfortable for the night.' And he did. When we left the train at 7 o'clock the next morning the same temperature of 65° had been kept up all the time." The greatest difficulty was found in supplying coal to cars heated by stoves, and the greatest suffering was in those cars. Mr. Toucey is now strongly of the opinion that the most certain and uniform heating of either a moving or a stalled train can be done with steam from the engine, and that, with proper management by the engineer, an auxiliary or emergency heating apparatus of any sort is unnecessary. Mr. Depew now undoubtedly regrets having made a hasty statement to a reporter on Tuesday, during the storm, that "stoves are the things" to be used for heating cars."

It is often maintained that it is bad policy for a small railroad to build its own locomotives. While it is doubtless true that locomotives can be most cheaply built by the large number of special tools and great sub-division of labor obtainable only in large manufactories, it often happens that the greater amount of personal supervision possible in a small shop will, when aided by skilled workmen, enable excellent work to be turned out. Many locomotives thus built are more durable and give better results in practice than the cheaper engines built in a contract shop. In a small shop, some degree of personal pride is often felt in doing work well, as the blame for bad work and the credit for good can be placed on the shoulder of the individual workman. In these days of machine work, when every effort is made to perform all the work with machines that cannot go wrong and can be handled by unskilled labor, the difference between good and bad workmanship is not so conspicuous as formerly, though the durability of boiler work largely depends upon the workmanship of the riveting, calking, etc.

Small shops are often accused of being slow and behind the times and averse to try, much less adopt, improvements. This is not always the case, as is shown in the account given in another column of an engine built in the shops of a small railroad in Kentucky. The engine contains more novelties and recent improvements than are to be found in the standard locomotives of some large lines possessing infinitely greater facilities and one hundred times the number of locomotives. On a small line a good master mechanic can make his personal influence felt in every important detail, while on a large line much of his time is necessarily taken up with matters of routine, and many essential points must be left to subordinates. As, however, the larger lines can afford to pay higher salaries, they command the best available talent, and thus as a general rule possess the best organization.

The Swedish & Norwegian Railway, which is better known as the only railroad which has penetrated the Arctic circle, has just been opened for through traffic. The first train of 41 cars, containing 1,000 tons of ore, lately arrived at the company's quay at Lulea from the Gellivara iron ore mountains. This deposit is another instance of the singular fact that the best iron ores, and practically the only ores suitable for making steel, are found in wild and sparsely inhabited regions, such as the Lake Superior peninsula, Santiago de Cuba, the island of Elba, Algeria, the wild mountains round Bilbao and an equally savage district in the south of Spain, which with many similar districts of less importance contribute the great majority of the non-phosphoric ore which is indispensable in the manufacture of good steel. While it is true that a large tonnage of steel is made in Germany and the Cleveland district of England by the Thomas-Gilchrist or basic process, it has been found by experience that it is not profitable or successful where, as in this country, the ores contain only a moderate amount of phosphorus. Abroad, however, the phosphoric slag commands a high price for manure, and is said to be fully equal to the best super-phosphate.

The New York Railroad Commission has again met with bad luck in the Assembly. The railroad committee of that body, after considering for two months the bills prepared by the Commission, has reported adversely on most of them. The bills which have met this fate are: those prohibiting discrimination against those who ship by canals, prohibiting grade crossings, regulating the relations of railroads with each other as to competition, making railroads liable for damage from fire started by the locomotives, and the bills to give to the Railroad Commissioners power to enforce their decisions through the courts. Most of these bills, if not all of them, have been repeatedly presented to the Legislature of the State in past years, and always with the same discouraging result. Some of them as submitted were in such shape as to require modification, but others were calculated to be of undoubted benefit to the roads and the public, and it is unfortunate that the same fate should again have overtaken them.

The annual report of the Cleveland, Columbus, Cincinnati & Indianapolis tells the familiar story of increased gross and net earnings and the less familiar one of increased rates per passenger and ton-mile. Not only has the volume of traffic increased but the rates obtained also. The net earnings, however, although increased 16 per cent. are diminished by charging over $200,000 to operating expenses for expenditures which have formerly gone to "additions to property." The reduction in ratio of expenses to gross receipts is therefore, apparently less than it really was. Nearly $106,000 spent in replacing wooden bridges with iron was charged to operating expenses. The President does not anticipate any considerable outlay for this purpose in future, but the General Manager recommends an increase of yards, tracks and round-houses at Cincinnati and Columbus, and considerable new equipment is needed and will be provided "as fast as the means of the company will warrant."

Gravel has hitherto been the favorite ballast in England, though rock, cinders and burnt clay are used in districts where good gravel is not easily procurable. The absence of dust has, however, induced the London & Northwestern to order 150,000 tons of granite chips, the London *Railway News* stating that the whole line will eventually be ballasted with this material. The chips will be thoroughly screened before being used, and the dust thus separated will be used in the manufacture of flags for paving footpaths.

NEW PUBLICATIONS.

Kirkman's Multiplex Records.—Mr. M. M. Kirkman has made various improvements in his recently announced duplex freight blanks, and now offers in addition, a record of cash fares collected, of baggage forwarded, baggage received, and of miscellaneous collections, as well as train baggagemen's records, all prepared on the same principle, that of using carbon sheets, so as to save one writing and insure absolute correspondence between the original and duplicate. In the cash-fare record, the carbon sheets are bound into the book and the under sheet is thick, similar to blotting paper, so as to obviate the necessity of using a tin; the upper one is detached and given to the passenger as a receipt. The blotting paper being very thick, an ordinary pocket-size book holds only 25 receipts. The blank is printed in a very convenient form, the most important items being provided for at the top, and those of less consequence at the bottom; and Mr. Kirkman suggests that in case a conductor is in a great hurry he write in only the first item (the amount of money collected), the signature having been inserted beforehand. While for a written receipt and memorandum this is no doubt a good thing, we think the objection of bulkiness which we mentioned in connection with the freight received record applies in considerable degree here; and the use of the punch, which is already in the conductor's hand, is so much more convenient than the use of a pencil, which must be fished out of the vest pocket, that we think it desirable to make as many as possible of the conductor's blanks in a form that can be filled up wholly by the use of the punch.

The record of switching charges is in "triplex" form: a record, a receipt for the consignee and an order to be given to the yard conductor being all written at once. The feature of the baggage record is the arrangement of the columns so that a number of checks (6, 8 or 10), all from one station for the same destination, can be entered on one line if desired, thus economizing space. If a column were introduced for some brief description of the baggage, this advantage would be reduced one-half, of course, but would still be worthy of note. Mr. Kirkman now furnishes his freight record books in a variety of forms; duplex where consignees sign for goods on the freight received record, triplex where it is desired to detach the receipts so that they can be signed outside the office (as at a side track where bulk freight is being unloaded), and quadruplex where a notice to consignee is desired in addition to the other papers named. Sample copies of either or all the nine forms referred to (50 cents each) may be obtained at the *Railroad Gazette* office.

In a recent notice of a new monthly paper, *The Publishing World*, we erroneously gave Messrs. E. & F. N. Spon as the publishers. The publishers are The Brinkerhoff Printing & Publishing Co., 771 Broadway. Messrs. Spon will shortly remove to No. 12 Cortlandt street.

Continuous Heating—Vermont Railroad Commission' Investigation.

The Vermont Railroad Commission held a meeting at White River Junction, Vt., on the 21st inst., for the purpose of investigating the various systems of heating cars by steam from the engine. Ex-Gov. Pingree, Chairman of the Board, stated at the opening of the session that the Commissioners had examined thus far only the systems which heated by steam from the engine, as in their opinion this seemed to be the only practicable type.

The Commissioners desired the benefit of the practical observations and results from railroad officials and inventors. He further stated that this investigation was a preparatory measure before making certain recommendations to the railroads of the state or to the General Assembly.

The Safety Car Heating and Lighting Company of New York was represented by Mr. Edward Porter, who explained the system in use by his company.

Mr. D. D. Sewall, of the Sewall Safety Car Heating Co., gave a description of his method, and in the course of his remarks he said that the chief difficulties in heating cars by steam from the engine were the coupling and control of the heat. He advocated the use of a coupling which would be interchangeable and stated that before steam heating could be a perfect success the same coupling would

have to be universally used. He then gave an account of some very satisfactory tests which had been made with his coupling, and claimed that the use of traps on the cars was unnecessary.

The McElroy & Edwards system wes represented by Dr. W. F. H. Edwards, of Detroit, who described his system as now used by the Delaware & Hudson Canal Co.

Mr. James Emerson described his system, which has been adopted by the Connecticut River road.

I addition to the steam heating systems, there was also exhibited a device for extinguishing the car lamps and the fire in the car heater or stove in case of collision or derailment. This device is the invention of A. Barry, of Warden, Quebec, and is in use on the Central Vermont and Canadian Pacific roads.

There were present: J. M. Foss, General Supt. Central Vermont; George E. Todd, Supt. Northern Div., Boston & Lowell; H. E. Chamberlain, Supt., and Joseph Warden, Master Car-Builder, Concord; R. C. Blackall, Supt. Machinery, Delaware & Hudson; E. H. Blossom, Saint Johnsbury & Lake Champlain; T. A. Mackinnon, Supt. Ontario & Atlantic Div., Canadian Pacific; and W. McWood, Master Car-Builder, Grand Trunk.

In the evening the Barrett system of electric lighting as now used by the Connecticut River road was shown.

TECHNICAL.

Locomotive Building.

The Taunton Locomotive Manufacturing Co., Taunton, Mass., has contracted with the Fitchburg for three locomotives with 18x24 cylinders, to replace three which were sold to the Cleveland & Canton.

Car Notes.

Receiver Marshall, of the Dayton, Fort Wayne & Chicago, is said to have decided to purchase 250 new coal cars, six locomotives, 4,000 tons of steel rails, and to construct a number of new bridges.

The Denver & Rio Grande lately ordered 500 freight cars from the Michigan Car Co. and 500 from the Pennsylvania Car Works, Ligonier, Pa. A large number of passenger cars and 30 locomotives are also being built.

The Fitchburg has recently added four new combination cars to its equipment, and will put on 10 new passenger cars this spring, which will be built at the company's shops. A new directors' car is now nearly ready for use.

It is stated that the Dauphin Car Works, of Harrisburg, Pa., have a contract to make a large number of cars for the Iron Car Co., of New York.

The St. Charles Car Co., St. Charles, Mo., has received a consignment of 160 water troughs to be used in new stock cars that are being built there.

The St. Charles Car Co. has contracted for the building of eight passenger cars for the St. Louis & San Francisco.

The Indianapolis Car & Manufacturing Co., Indianapolis, Ind., are building 200 cars for the Ohio Valley.

Bridge Notes.

Reilly & Gude have contracted to erect a bridge over the Warrior River near the mouth of Yellow Creek, for the Tuscaloosa Northern road.

It is reported that a large iron bridge will be erected at Milford, Del., and that John D. Norris, of Georgeton, Pa., can furnish details.

The Milwaukee Bridge & Iron Co. has contracted for the construction of a bridge at Beaver Dam, Wis.

It is reported that about $150,000 will be expended by the city of Denver, Col., this season in building viaducts over the railroad tracks.

Proposals are wanted at Atchison, Kan., until April 11, for repairing three iron bridges. Address F. Giddings, County Engineer.

The Committee on Roads and Bridges of Minneapolis, Minn., has awarded the contract for the superstructure of the new bridge over the railroad tracks on Lyndale avenue to the Canton Wrought Iron Bridge Co. at $19,515.

The Detroit River Winter Bridge Co. has applied to the Dominion Parliament for a charter to build a bridge from Windsor or Sandwich to Detroit with W. K. Muir, W. Hendrie and others as incorporators. The capital stock is placed at $500,000. The bridge is to have one or two railroad tracks and three draws.

Six bridges were swept away near Lebanon, Conn., by the breaking of Exeter Pond.

The caisson of the third pier of the Chicago & Northwestern bridge across the Missouri at Sioux City, Ia., has been lowered to its foundation.

The contract for the iron bridge at Manchester, Mo., has been let to the Kansas City Bridge & Iron Co., for $11,000.

The County Commissioners will build a bridge across the Platte River at Petersburg, Col.

The County Commissioners will build an iron bridge at Santa Cruz, Col.

Manufacturing and Business.

The city of Cincinnati has contracted with the Laidlaw & Dunn Co., of that city, for two Galloway boilers 7 × 28 ft., with a 48 in. chimney, 150 ft. high, to furnish 600 h. p. for the city water-works. The amount of contract is about $11,000.

The contract for supplying the material for the depots, stock yards and section-houses for the Chicago, Santa Fe & California on the old line between Chicago and Pekin, has been awarded to the R. B. Stone Lumber Co., of Chicago. This is the second contract that this firm has secured; the first was for the material for similar structures on the new part of the line between Pekin and Kansas City. It will need about 5,000,000 ft. of lumber for these structures besides other material.

Chas. A. Schieren & Co., of New York, report recent sales of leather link belting to the following and several other firms: Putnam Machine Co., Fitchburg, Mass.; A. H. Fogg & Co., Houlton, Me.; Utica Electric Light Co., Utica, N. Y.; H. L. Childs & Co., Pittsburgh, Pa.; W. F. Bowers & Co., San Francisco, Cal.; U. S. Electric Light Co, Washington, D. C.

The Inter-state Construction Co., of East St. Louis, Ill., has been incorporated to construct railroads, bridges, etc., and to operate mines, by James Campbell, N. B. Munson and others. Capital stock is $800,000.

The Board of Public Affairs, Cincinnati, O., has awarded a contract for boilers to the Heine Safety Boiler Co.

The George F. Blake Mfg. Co. and Copeland & Bacon, manufacturers of machinery, were burned out by the destruction of the five-story iron buildings on Arch street, Philadelphia.

William Tod & Co., of Youngstown, O., are making the rod reels for the new rod mill of the Joliet Steel Co., Chicago, Ill. They also have an order from the Crescent Steel Works for an 18-in. hydraulic accumulator of a new pattern. They have recently furnished six of their Porter-Hamilton engines to the Carnegie Steel Mills, and are building a 450 horse-power for the Straight Fibre Iron Co., of Chicago.

The Rogers Car Axle Box Company has been organized to manufacture, under a patent granted to Hamilton Rogers, the Rogers car axle box, and will erect a shop in Toledo, O.

Trevor & Co. have just completed for the Union Indurated Fibre Co. a 50-ton hydraulic press, which is intended for pressing pulp for the manufacture of the larger articles.

The Carbondale & Jermyn (Pa.) electric road, which uses the Sprague motor, was formally opened March 28.

Iron and Steel.

The new furnace of the Centre Iron Co., at Bellefonte, Pa., was started on March 24. It has a capacity of 100 tons of pig iron per day.

Seyfert's large rolling mill, at Naomi, Pa., after a stoppage of over two months, will resume operations next week. The wages of all employés will be reduced 10 per cent. after April 1.

The North Chicago Rolling Mills at South Chicago will shut down early in April. Since Feb. 6, when the mill resumed work after an interval of about three months, the plant has been working day and night. The output has averaged 5,000 tons of steel rails per week on orders for April and May delivery.

The Pottstown Iron Co., at Pottstown, Pa., has announced a reduction in puddlers' wages of 25 cents per ton, and a proportionate reduction in the wages of the other employés, to take effect April 1.

No. 3 furnace of the Chestnut Hill Iron Ore Co., at Columbia, Pa., was blown out on the 17th inst. No. 2 is still banked, and the company do not contemplate blowing in or starting up until the prospects in the iron trade are better.

No. 3 furnace, of the Pennsylvania Steel Co., at Steelton, Pa., which has been banked for more than two months, was put in blast last week.

The mill of P. L. Kimberly & Co., of Sharon, Pa., has closed down indefinitely.

No. 5 furnace of the Allentown Iron Co., at Allentown, Pa., chilled on the morning of the 13 inst., and was blown out. This is the only furnace of the company that has been in operation for some time, and its chilling makes the entire plant idle.

No. 3 furnace of the Thomas Iron Co., at Hokendaqua, Pa., was blown in on Tuesday the 13th inst.

Messrs. Bolckow, Vaughan & Co., of Middlesborough (England), have secured an order for 30,000 tons of steel rails and sleepers for the Bengal-Nagpur Railway. The price of the rails is the lowest yet reached, £3 14s. per ton, f. o. b., or $18 per gross ton.

Car Heating Notes.

The McElroy system of heating has been applied to two trains on the New York Central.

Three systems of continuous heating are now undergoing test on the West Shore, the Sewall, the Martin and the Safety.

The Rail Market.

Steel Rails.—The market is very quiet, and prices unchanged from last week. It is said that most of the Eastern mills have orders enough to keep them going for two months.

Old Rails.—The market continues dull and weak. Tees are quoted at $21, and doubles at $21.50.

Rail Fastenings.—Quotations are: Spikes, 2.15c.; bolts and nuts, 3c., and angle plates, 1.95, all delivered.

Train Telegraphy.

An interesting test was given at the United States Hotel, Boston, on the 26th inst., of the Consolidated Railway Telegraph Company's system of train telegraphy, as now used by the Lehigh Valley road. The exhibition was given under the direction of Mr. Samuel K. Dingle, Assistant Superintendent of the company, before a large and interested audience. A long table was placed in the large dining hall of the hotel, and upon it was laid a long tin speaking tube to represent the tin roof of a car. At one end was placed the train instruments connected with the tin tube and the ground wire was connected with the gas pipes. A telegraph wire was stretched through the room some six feet from the tin tube and running into an adjoining room, where station instruments were placed. Several messages were sent back and forth during the evening and the success of the system was demonstrated to the satisfaction of the gentlemen present. Mr. Dingle explained in detail the construction and working of the system and stated at the outset that he would much prefer to show the system on a moving train. Among the gentlemen present were J. H. French, Division Superintendent, J. N. Lauder, Superintendent of Rolling Stock, and George T. Taylor, Chief Train Dispatcher, of the Old Colony; H. B. Chesley, Division Superintendent, and Z. Gibbs, Chief Operator, of the Boston & Albany; H. C. Robinson, Chief Train Dispatcher, Lowell System, Boston & Maine; Thomas Roche, Superintendent Eastern Division, and J. W. Larish, Electrician, of the Western Union Telegraph Co.; and E. B. Pillsbury, Circuit Manager of the United Lines Co.

New Locomotive.

A locomotive has lately been constructed for the Ashland Coal & Iron Railway at the company's shops, Ashland, Ky., from the designs of Mr. E. M. Roberts, the Master Mechanic. The engine is named "Winslow," and is designed for general service and equipped with all the latest improvements, and no pains nor expense have been spared to make it perfect in every respect, as will be seen from the following brief description:

The cylinders are 18 by 24 in.; driving-wheels 62 in.; driving-wheel base 8 ft. 8 in; solid end channel side rods; Pennsylvania pattern cross-head and main rod; balanced valves of special design; May's patent reverse lever latch; U. S. metallic packing for pistons and valve rods; cast-iron running boards, 1¼ in. thick under cab and ½ in. thick forward; extension front of special design, with asbestos lining on inside to protect smoke-box sheet from heating and warping; two No. 8 Monitor injectors; two 3-inch Kunkle pop-valves, Eames vacuum driver and tender brake. The sand box, instead of being on top of the boiler, is placed directly over the driving wheels, under the running boards. The tender frame is of Phœnix channel iron, Schenectady patent, iron trucks, 33-in. wheels. Capacity of tender 2,700 gallons of water and six tons of coal. The weight of the engine is 92,000 lbs.

Locomotives with Radial Driving Axles.

Five locomotives on Klose's system are running on a narrow gauge government line between Brod and Sarajevo, in Bosnia, Australia. These locomotives have four axles, the three forward axles being coupled together, while the fourth is under the movable tender frame. The middle axle is the driving axle, and the wheels on it have no flanges. The engine can thus run around very sharp curves, even of 100 ft. radius, or 57 degrees, the sharpest on the New York elevated being 90 ft. radius, or 64 degrees. The other two coupled axles are equidistant from the central axle and are carried in specially-formed axle boxes. These boxes are so connected together that the radial movement of one in one direction causes an equal movement of the other in an opposite direction, the converging motion being regulated by levers, which are also acted upon by the tender frame, which for this purpose is made movable around a central point on the locomotive frame and acts by means of two rods. Thus all three of the movable axles converge at the same time to the same centre. The coupling rods are provided with a differential arrangement for responding to the increase or decrease in distance between the axles. The chief dimensions are as follows:

	Ft.	In.
Distance between axles 1 and 2 and 2 and 3	5	0
Distance between axles 3 and 4	10	0
Total length of locomotive (inclusive of tender) over buffers	30	8
Height of stack from rail	10	8
Maximum width of engine	6	8
Gauge of road	2	6½
Driving wheels, dia.	3	0
Tender wheels, dia.	2	2

The weight in full working trim is about 24½ tons, distributed about equally on the four axles. Tests made by a special committee gave full satisfaction, mean speeds of 15 to 20 miles per hour and maximum of 25 to 30 miles per hour being easily attained, while curves of 175 to 200 ft. radius were traversed at 22 miles per hour. One of these locomotive has run 30,000 miles without undergoing any but the usual repairs.

THE SCRAP HEAP.

How History is Written.

A French contemporary has the following:

"JAY GOULD VICTIM OF AN ACCIDENT.—JACKSONVILLE, Floride, 18.—The train from Vestibula has been smashed up (mis en pièces) a little way from Savannah. Jay Gould and his family are among the passengers. Doctors from Savannah and Jacksonville, etc."

In a Minority.

The *Epoch* relates the story of the editor who told a young man "Your article, I am sorry to say, is hardly up to our standard." Young man—"Why my mother thinks it's clever, my wife thinks it's clever, and I think it's clever—three to one, sir, the balance is in my favor."

This recalls memories of the car coupler man.

Euphoniosity on the Elevated.

A brakeman on the Third avenue road is gifted with a very musical voice, which only needs a little cultivation to enable him to take a place among our foremost singers. At present it is in somewhat of a crude state, and sounds not unlike the rasping of a saw when it strikes a nail. But this little defect is more than counterbalanced by its penetrating power. It begins very softly, the first syllable breaking so gently on the ear that passengers imagine the mythological sirens are tuning their harps to lure them to destruction. The next note is much clearer. It continues to grow sharper and clearer, till by the time the final note is reached it pierces and harrows like the last despairing cry of a fallen angel. Yesterday, as the train was nearing Chatham Square, he surpassed himself. Poking his head in at the door, he began.

Cha—THAM NEXT.
Cha—nge F'SOUTH.
Fa—a REE.
THIS train GOES
To City Haw
Er—LL—LL.

There was a great exodus when the train stopped; but whether business haste or the man's voice caused it will never be known.—*New York World.*

An Old Joke in a New Dress.

De Smith—"I declare! Here is Mrs. Gaudefly in the drawing-room and her train is out in the hall yet!"

Travis—"Of course; she is wearing one of those new vestibule trains."—*Burlington Free Press.*

Rather Severe on an Old Man.

De Lesseps.—"Yes, we are still working on the Panama canal, and have got hopes. By the way, you have the advantage of me."

American Tourist.—"My name is Keely."

"Ah! The Keely who is inventing a new motor?"

"The same."

"How fortunate we have met. When my canal is completed I will use your motors to run our towboats."—*Omaha World.*

Fiendish Revenge for the Blizzards.

An interesting meeting took place recently at the offices of the Railroad Commissioners for the state of Middakota. A stranger with an artificial blush and clad in part of a grain door and a pair of odd boots entered, and having tyled the lodge, opened the evening's amusement in the most impressive and orthodox manner by solemnly unrolling a piece of six-cent brown sugar-paper. This action disclosed a mass of uncertain metal, which bore a striking resemblance to the heel of a cow with a whitewash brush and aged tomato can attachment. The railroad commissioners were much alarmed, but the gentle stranger endeavored to reassure them by observing that this was the only car coupler worthy of the name ever invented, and that it consisted of a powerful nut cracker, three cams in assorted sizes, several spiral springs, a pack of dogs of different breeds, a tame pin and a link warranted not to bite. The device was worked by a crank of the fourth power which, by means of marvelous mechanism, little understood except by Dr. Mackenzie, pronounces distinctly the mystic watchword of the fraternity "Thysissah Kahkuppler."

The Commissioners also tried to work the machine but failed owing to their insufficient crank power. The stranger then gave the second pass-word "Themoddle issnott egg-acktlierite." The Commissioners were unable to recall the appropriate lines with which this challenge should be answered, and the stranger (miraculous to relate) departed, leaving his farewell in the orthodox form of the order "Thysissthee boskupplah."

The latest accounts state that the surviving Commissioner is gradually regaining consciousness.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

An act of Congress of July 14, 1870, levies a tax of 2½ per cent. on the undivided profits of certain railroads, "which have accrued, been earned and added to any surplus, contingent or other fund," during and for the year 1871. A railroad company used during 1871 over one hundred thousand dollars undivided profits in the construction of new works. The Supreme Court of the United States decides that this money was not taxable as profits for that year.[1]

A railroad company issued bonds, interest payable annually, with an option to pay it in scrip if the net earnings of a portion of the road were not sufficient to pay it in cash. The interest due on July 1, 1882, and July 1, 1883, was not

paid, and the bondholders were so notified. One of them immediately brought suit for his interest. The Supreme Court of the United States holds that the action is well brought, and is not affected by the fact that several months later the road issued scrip for the interest. It should have exercised its option on the day the interest fell due.[2]

By an act of Congress of March 3, 1871, certain surveyed lands were granted to a railroad, provided it should complete its line within five years, and failing to do so, that Congress might take measures to secure its completion. A subsequent act of Congress provided that before any lands granted to a railroad shall be conveyed, the costs of survey must be paid by the party in interest. The line was not completed in the time, and when the patents were issued, the charges for surveys were paid by the railroad, under protest. The Supreme Court of the United States decides that Congress had power to impose the condition as to costs, and that the road cannot recover the money paid.[3]

In California a railroad company having large tracts of vacant land issued a circular inviting settlement thereon, and stating that settlers who in good faith improved the land would generally be given the preference in purchasing. To obtain a contract for conveyance of part of the land, plaintiff falsely represented to the railroad that he had settled thereon, thereby deceiving the railroad and inducing it to make the contract, which it would not have done but for the deception. The Supreme Court decides that the fraud is a good excuse for the railroad's refusing to convey the land.[4]

A Kansas statute permits service of summons in actions against railroads upon (among others) "local superintendents of repairs." The Supreme Court rules that a section foreman falls within this term.[5]

In Kansas, after the presentation of the petitions of several townships for an election in aid of a railroad, and a refusal by the commissioners to act thereon, the laws under which they were presented were repealed, but the repealing statute provided that the act should not affect any election pending at or prior to its taking effect. The Supreme Court rules that the wrongful action of the commissioners could not defeat the rights of the taxpayers to proceed with the election, or invalidate its result.[6]

In Ohio a statute authorized the commissioners of a county to build a bridge across a river in a certain town, the town council by ordinance giving them the right to occupy as much of the street as was necessary for the bridge and approaches After the bridge was built, a railroad in building its road along the bank of the river made an excavation near one of the abutments of the bridge, making it unsecure. The Supreme Court holds that the commissioners have no right of action against the railroad. Their power and authority over the bridge ceased when it was finished.[7]

In Illinois a railroad company leased its road, and 19 years afterwards brought suit to set aside the lease because it was made without the stockholders' written consent, as required by law. The United States Circuit Court rules that the requirement of consent was a personal benefit which the stockholders waived by long acquiescence.[8]

Under the statutes of Kansas an action for personal injuries must be brought within two years after the cause of action accrues, and Section 25 extinguishes the cause of action after that time. The plaintiff sustained personal injury on a Kansas railroad, and immediately went to Missouri, of which state he was a resident, and there resided until trial, and did not bring action until more than two years had elapsed. The United States Circuit Court holds that the statutes of Kansas would not bar an action given by the common law, unless both parties resided in that state during the full period of limitation.[9] So in North Carolina the Federal Court rules that in an action against a railway company to recover damages for personal injuries sustained, the right to relief is governed by the laws of the state in which action is brought, although it may be barred under a statute of limitation of the state in which the cause of action accrued.[10]

In Kansas a judgment was recovered against a railroad for failing to construct a cattle-guard where the road entered the premises of the plaintiff, and when the judgment was recovered, the company agreed to end the litigation, and also to put in the cattle-guard, and to pay the judgment, less a stated sum, within 30 days; in which event the plaintiff was to accept the sum so agreed on in full payment of the judgment and costs. The Supreme Court decides that the time within which the cattle-guard was to be constructed, and the payment to be made, were the important elements of the agreement, and that, as the company failed to comply with these conditions, the plaintiff was at liberty to enforce by execution the full payment of the judgment as rendered.[11]

In Idaho the Supreme Court holds that a railroad company cannot avoid the responsibility of operating its road by allowing others to have the control and management of its road bed or trains without the consent of the power whence it derives its franchise.[12]

In Illinois a judgment had been obtained against a subscriber to the first mortgage bonds of a railroad, for their subscription price. The bonds had been deposited by the railroad company as security for the debts of the company, and could not have been delivered. The Court rules that upon payment of the subscription the subscriber is entitled to a credit on the judgement for the value of the bonds at the day of such deposit, and where that sum, with other credits, pays the judgment, such judgment will be perpetually enjoined.[13]

Carriage of Goods and Injuries to Property.

In Pennsylvania an action was brought against a railroad by the assignee of freight receipts for the misdelivery of live stock to parties whom the road had been directed to notify of the arrival of the property, but who obtained it without presenting any bill of lading or order of the consignee. The Supreme Court of the United States holds the railroad responsible.[14]

In Illinois a railroad connecting with all the lines running into East St. Louis was engaged in carrying cars containing different kinds of freight from the tracks or depots of these roads to the elevators, factories and other places of business on the tracks or side tracks of the other roads, and in returning the cars, after having been unloaded by the consignee, to the proper company. It received from the Wabash Railroad two flat cars loaded with coal, to deliver to a glucose factory, and to return the cars when unloaded; and its only means of connection with that establishment was a turn-table connecting its tracks and a private track of the Glucose Company, extending to its business establishment, a distance of some 300 ft. from the turn table, and it had no control over the track of the Glucose Company. The Supreme Court holds that when the connecting railroad had run the cars upon the turn-table, and then shoved them off upon a private track of that company, as it was accustomed to do, it had discharged its duty as a carrier, and its liability as an insurer had ceased; and the accidental burning of the cars before their return to the turn-table and delivery to it to be returned to the Wabash Railroad did not render it liable.[15]

In Missouri the United States Circuit Court holds that where a railroad company delivers all of its baggage to a Union Depot company, to be cared for and delivered to passengers on presentation of checks, it makes such depot company its agent for such purpose, and is liable as a common carrier for loss of such baggage while in the Depot Co.'s custody that occurs before a reasonable time for delivery has elapsed. The passenger arriving at his destination on the afternoon of a day should ordinarily demand his baggage by the night of that day, and if he does not, the liability of the railroad as a carrier ceases, and it becomes simply a warehouseman. But it appearing in this case—the passenger not having called for his baggage until the next day—that the business of the station often required as much as two hours from the time of arrival until the delivery of baggage, and that the baggage in question was stolen in that time, the company was held liable. In this case, it appearing that the baggage sued for was the trunk of a jewelry salesman, containing his stock in trade; that the agent who checked it knew of the fact; and that plaintiff made no effort at concealment, the company was held liable as for loss of ordinary baggage.[16]

In Illinois the Supreme Court lays it down that all special damages, present and prospective, to the owners of lands, resulting, or to result, from properly constructing, maintaining and operating a railroad, under the laws of this state, constitute, as to such landowner, one single cause of action, which may be enforced under the Eminent Domain Act, or any other appropriate form of action, Where, after such right of action has once accrued, the owner of land thus injured conveys it to another, the latter can maintain no action for any damages he may subsequently sustain, which would have been anticipated and allowed as prospective damages in any suit which his granter might have brought in his own name. These rulings, however, do not protect a railroad company from liability for damages resulting from its negligence either in the construction, maintaining or operating its road.[17]

In Indiana the Supreme Court say that the general rule is that where land is taken by a railroad company without right, the owner may maintain ejectment. But one important exception to this rule is that a failure to bring the action until after public interests have intervened will prevent its successful prosecution. Acquiescence for a considerable period after the railroad company has entered upon its duties as a common carrier will ordinarily defeat the action.[18]

In Wisconsin the measure for damages for the taking of land for railroad purposes is said to be the fair market value of the part taken, and the amount of the damage to the residue by such taking, to be estimated by considering the value of the land for the purposes for which it was used when taken, or its reasonable adaptability to particular uses, having reference to the existing wants or business of the community, or such as might then have been reasonably expected in the near future. But the plaintiff cannot recover for injury to drives about the premises, the annoyance or danger of fire from passing trains, loss of patronage to a hotel on such land, the cost of a retaining wall along the track, or for improper or negligent construction of the road.[19]

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1 Marquette, H. & O. R. Co. v. U. S., 8 S. C. Rep., 319.
2 Tex. & S. R. Co. v. Marlor, 8 S. C. Rep., 311.
3 New Orleans P. R. Co. v. U. S., 8 S. C. Rep., 417.
4 Kelly v. Cent. Pac. R. Co., 16 Pac. Rep., 386.
5 St. L. & S. F. R. Co. v. Deford, 16 Pac. Rep., 442.
6 State v. Comm. Reno Co., 16 Pac. Rep., 337.
7 Comms. v. Pitts. & W. R. Co., 12 West. Rep., 852.
8 St. L., V. & T. H. R. Co. v. T. H. & I. R. Co., 33 Fed. Rep., 440.
9 Finnell v. South Kas. R. Co., 33 Fed Rep., 427.
10 Nonce v. R. & D. R. Co., 33 Fed. Rep., 429.
11 St. L. & S. F. R. Co. v. Rierson, 16 Pac. Rep., 443.
12 Palmer v. Utah & N. R. Co., 16 Pac. Rep., 553.
13 Galena & S. W. R. Co. v. Ennor, 12 West. Rep., 761.
14 North Penn. R. Co. v. V. Com. Bank of Chicago, 8 S. C. Rep., 266.
15 East St. L. Connecting R. Co. v. W., St. L. & P. R. Co., 12 West. Rep., 834.
16 Jacobs v. Tutt, 33 Fed. Rep., 412.
17 O. & M. R. Co. v. Wachter, 12 West. Rep., 812. A similar case is also decided in Indiana. Ind., B. & W. R. Co. v. Allen, 12 West. Rep., 910.
18 Ind., B. & W. R. Co. v. Allen, 12 West. Rep., 887.
19 Laflin v. C., W. & N. R. Co., 33 Fed. Rep., 415.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Allegheny Valley, annual meeting, Pittsburgh, Pa., April 10.

Atchison, Topeka & Santa Fe, annual meeting, Topeka, Kan., May 10.

Catawissa, annual meeting, Philadelphia, Pa., April 3.

Calabasas, Tucson & North Western, annual meeting, 22 Liberty street, New York City, April 3.

Chicago & Alton, annual meeting, Chicago, Ill., April 2.

Chicago & Grand Trunk, annual meeting, Chicago, Ill., April 11.

Chicago, Rock Island & Colorado, special meeting, Denver, Col., April 30.

Colorado Central, annual meeting, Denver, Col., April 10.

Colorado Midland, annual meeting, Colorado Springs, Col., April 2.

Georgia Pacific, special meeting, Birmingham, Ala., March 31.

Joliet & Chicago, annual meeting, Chicago, Ill., April 2.

Kansas City, Clinton & Springfield, annual meeting, Kansas City, Mo., April 7.

Kansas City, Springfield & Memphis, annual meeting, Kansas City, Mo., April 7.

Lake Shore & Michigan Southern, annual meeting, Cleveland, O., May 2.

Mahopac Falls, special meeting, 69 Wall street, New York, April 19.

Michigan Central, annual meeting, May 3.

Morgan's Louisiana & Texas, annual meeting, New Orleans, La., April 2.

New York Central & Hudson River, annual meeting, Union Depot, Albany, N. Y., April 18.

New Jersey & New York Extension, special meeting, New York City, April 5.

Panama, annual meeting, New York City, April 8.

Southern Pacific, annual meeting, San Francisco, Cal., April 4.

Union Pacific, annual meeting, 101 Tremont street, Boston, Mass., April 25.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, quarterly, 1¾ per cent., payable May 1.

Evansville & Terre Haute, quarterly, 1¼ per cent., payable April 17.

Missouri Pacific, quarterly, 1½ per cent., payable April 16.

New York & New England, 3½ per cent., on preferred stock, payable May 1.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

Association of North American Railroad Superintendents will hold its fifteenth annual meeting in New York City, April 9 and 10

The *General Time Convention*, spring meeting, will be held in New York, April 11.

The *Master Car-Builders' Association*, annual convention, Alexandria Bay, N. Y., commencing June 12.

The *American Railway Master Mechanics' Association*, next annual convention, Thousand Islands, N. Y., June 19.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The Western Railway Club meets in Chicago the third Wednesday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *Engineers' Club of St. Louis* meets the first and third Wednesday of each month till June.

The *Engineers' Society of Western Pennsylvania* meets in Pittsburgh the third Tuesday of each month.

Minneapolis Society of Civil Engineers.

A regular meeting was held March 21. The paper of the evening was the Collection and Disposal of City Garbage, by R. Kenrick. Mr. Kenrick maintained that cesspools should be watertight and emptied by a system of house to house collection; that privies should be replaced by dry earth closets. He quoted the experience of the town of Rochedale, England. The discussion which followed turned upon the problem of collection and disposal of the garbage in the city of Minneapolis, and a committee was appointed to learn what laws exist with reference to the sanitary regulations of the state and city, to report at the next regular meeting.

Engineers' Club of St. Louis.

A regular meeting was held March 21. William S. Henry and John B. Myers were elected members. Mr. S. F. Burnet read a paper on Cements and Mortar. He gave some practical hints on mixing and using them; also how specifications should read and tests be made. He exhibited specimens and gave results of tests. Some information on sand, water and lime was given. The damaging effects of freezing were shown. There was some discussion of the paper.

The Secretary read a short paper by E. L. Corthell, in review of Mr. Robert Moore's paper on Interoceanic Ship Transfer, read before the club March 2, 1887. The criticisms of Mr. Moore on the floating pontoon, the wheel load, comparative economy and capacity of carriage were reviewed to show the practicability of the design. Mr. Moore replied at some length, answering the points brought up, which he claimed did not change the material aspect of the problem.

Prof. Johnson called attention to some bars of iron which had been broken in a testing machine after having been strained beyond their elastic limit and then allowed to rest. The results were: After a rest of one day, an increase of strength of 16 per cent was shown; seven days, 22 per cent; sixteen days, 26 per cent.

Mr. Bruner called attention to a remarkable case of filtering water through an ordinary brick wall. Prof. Nipher reported the results of some experiments on leakage of gases through brick walls.

Papers by Prof. W. B. Potter and S. Bent Russell were announced for the next meeting, April 4.

New York Railroad Club.

The next meeting of the Club will be held April 19. On account of the great storm which prevailed in New York on the week of the March meeting no meeting was held, and the committee has decided to bring up the same subjects for discussion at the April meeting that were intended for the March meeting, "Automatic Draw Bars for Freight Cars" and "Uniform Couplings for Steam Heating Cars."

Civil Engineers' Club of Cleveland.

The annual meeting was held March 13, and the following officers were elected: John Whitelaw, President; W. R. Warner, Vice-President; James Ritchie, Recording Secretary; C. O. Arey, Corresponding Secretary; S. J. Baker, Treasurer; M. E. Rawson, Librarian; W. H. Searles, Member of the Board of Managers of the Association of Engineering Societies.

Boston Society of Civil Engineers.

At the annual meeting the following officers were elected: President, Desmond FitzGerald; Vice-President, Fred. P. Stearns; Secretary, S. Everett Tinkham; Treasurer, Henry Manley; Librarian, Henry D. Woods; Auditor, Thomas Aspinwall.

American Society of Civil Engineers.

A regular meeting was held March 21. The Secretary read a paper by Mr. Edward Prince describing a 30-in. wooden conduit constructed for the Quincy Water-Works, to carry water from a crib 1,480 ft. out in the Mississippi to the iron pipe leading to the pump-well. It was launched in sections of from 40 to 550 ft. in length. Mr. Kuichling presented a description of a sewer at Dresden, and Mr. Hering referred to experiments now being made in New York on the flow in sewers and to similar experiments at Washington and Philadelphia. The Secretary announced the death of Squire Whipple, and Mr. Theodore Cooper made some remarks on the influence of Mr. Whipple's work on American bridge building.

Engineers' Club of Columbus, Ohio.

This club has recently been organized, with 23 members. At a meeting March 3 the following officers were elected: Josiah Kennear, President; R. R. Marble, Vice-President; Julien Griggs, Secretary and Treasurer. Regular meetings will be held the first Saturday evening in each month.

Society of Engineers and Surveyors of Kansas.

This society met on the 23d to effect a permanent organization. It was decided to issue an invitation to all county surveyors and engineers to send in their applications for membership for action by June 1, when the executive committee will hold a meeting. It was arranged to hold the next annual meeting in Topeka, on the second Thursday in January, 1889. The present officers are: Charles Spalding,

Topeka, President; J. H. Lasley and H. H. Mead, Vice-Presidents; H. B. Mitchell, State Auditor's office, Topeka, Corresponding Secretary; A. H. Wetherbee, Recording Secretary; M. Z. Jones, Treasurer.

The National Association of General Passenger Ticket Agents.

The spring meeting was held in St. Augustine, Fla., March 20 with 80 members present.

A new form of coupon ticket presented by W. J. Turner, of the Mobile & Ohio, was referred to the Coupon Ticket Committee.

The following resolutions were adopted:

Resolved, That the subject of regulations for the transportation of advertising matter over the various lines represented in this Association be taken up by the Coupon Ticket Committee, with a view to their making a report at the next meeting.

Resolved, That the plan of checking excess baggage proposed by the National Association of General Baggage Agents be approved.

The following resolution, regarding the limitation of correction sheets, was read:

Resolved, That claims against foreign lines, on account of erroneous proportion, must be made within ten months following the month in which tickets are reported, otherwise correction sheets may be returned as void, by lines members of this Association. Also whenever claims are made for increased proportions, the basis used in establishing such must be invariably given.

This was referred to a committee, consisting of E. A. Ford, A. J. Smith, E. P. Wilson, Jas. L. Taylor and F. Chandler, who were directed to confer with the Accounting Department, so far as it may be necessary, on the subject, between this time and the next meeting, and report at that time.

The next meeting will be held in Saratoga, N. Y., Sept. 18.

PERSONAL.

—Peter Walling has resigned the position of Superintendent of Bridges of the Wisconsin Central.

—E. G. Russell, Assistant General Superintendent of the Chicago, St. Paul & Kansas City, has tendered his resignation.

—J. O. D. Lilly, formerly Superintendent of the Madison & Indianapolis and later Superintendent of the Lafayette & Indianapolis, died at Mauch Chunk, Pa., last week.

—The death of Alfred Hunt, President of the Bethlehem Iron Co., occurred at Jacksonville, Fla., March 27. He was 72 years old, and was traveling for the benefit of his health.

—Edwin Noyes, formerly Superintendent of the Maine Central, died in Boston, March 23, at the age of 72. He was also at one time Superintendent of the Michigan Central.

—Mr. A. Gunnison, formerly Vice-President of the Safety Car-Heating Co., has been elected President of the Sewell Safety Car-Heating Co., with office at 120 Broadway, New York, vice B. Bradbury, deceased.

—Captain W. W. Peabody, General Manager of the Trans-Ohio Division of the Baltimore & Ohio, fell on the ice in Madisonville, Ind., on March 24, displacing a knee cap and receiving other injuries which it is feared will injure him permanently.

—Joseph W. Drexel died in New York, March 25, of Bright's disease, from which he had been suffering for some time. He was for many years a member of the banking house of Drexel, Morgan & Co., but retired about 10 years ago. He was 58 years old.

—Col. Thomas McKissock, President of the Council Bluffs & St Louis Railroad, died in St. Louis last week. Col. McKissock entered the railroad service in 1846, being connected with the survey of the New York & Erie road. Since 1856 he has been connected with several western roads as Chief Engineer and Superintendent. He was 65 years old.

—Sir Joseph W. Pease, M. P., who has been appointed Deputy Chairman of the Northeastern Railway (England), is a grandson of Edward Pease, the "Father of Railways," who carried the Stockton & Darlington Railway scheme through Parliament, and, in the face of ridicule and opposition of the strongest kind, succeeded in demonstrating the practical value of the "iron horse."

—George F. Harris, one of the earliest railroad contractors in this country, died at Clayton, Ala., March 18, aged 70 years. In 1846 he built the Vermont & Massachusetts road, and in 1852 and 1853 the Great Western of Canada. In 1880 he invented the Harris tracklaying machine, and since then has devoted his attention entirely to tracklaying, and was the senior partner in the firm of George F. Harris, Son & Co. It is said that in 1886 one-seventh and in 1887 one-fifth of the track laid in the United States was laid by the machine controlled by this company.

—Isaac Hinckley, President of the Philadelphia, Wilmington & Baltimore, died in Philadelphia March 28, at the age of 73. He entered the railroad service in 1846 as Superintendent of Transportation of the Boston & Providence, which place he held until January, 1848. After this, he was connected with several New England roads, and in April, 1865, he was elected President of the Philadelphia, Wilmington & Baltimore, which office he has held continuously since.

He was also President of the Eastern Railroad Association during the first 11 years of its existence. Mr. Hinckley was widely known and greatly esteemed.

—Charles Latimer died Sunday, March 25, at his home in Cleveland, O., from the effects of a stroke of apoplexy. Few railroad men in America have been so well known and so universally respected and beloved. He was born in Washington, D. C., Sept. 7, 1827, entered the navy at the age of 14 and remained in that service for about 13 years. Afterwards he was for a time engaged in steamboating on the Mississippi. In 1854 he took a subordinate position on the engineering corps of the Mobile & Ohio Railroad, and was afterward Assistant Engineer of the Mississippi & Tennessee and Assistant Engineer of the Mobile & Ohio. He was connected with the United States Military Railroad service and went with Sherman's army to the sea, and during the war conducted the survey of the railroad line between Columbus and Cairo. After the war he was connected for a short time with the St. Louis, Vandalia & Terre Haute and with the Dixon, Peoria & Hannibal, now part of the Chicago, Burlington & Quincy system. In 1871 Mr. Latimer became Assistant Engineer of the Chicago & Michigan Lake Shore (now Chicago & West Michigan) and was later made Chief Engineer of that road. Subsequently he was for about six months Principal Assistant Engineer on the extension of the Hannibal & St. Joseph, after which he took a position on the Atlantic & Great Western, where his work has since been. In 1874 he was chosen Chief Engineer of that road now known as the New York, Pennsylvania & Ohio, which position he held until quite recently. Latterly his title has been Consulting Engineer.

Mr. Latimer's experiences in Central America and his operations in the Southern states, particularly while owner of and in command of a steamer, made him acquainted with many men and many sides of the human character, which he looked at with much penetration as a business man, at the same time influenced by the feeling of a philanthropist. One not quite intimate with him would first notice his unusual sympathy with an individual's misfortune, or for a lapse from virtue, without suspecting his shrewd understanding of the causes of the evil, as to which he would probably be silent.

As an engineer he was remarkably practical, devoted to details and to statistics of cost and expenditure. He had a good practical knowledge of mathematics, but not of the higher branches of the science. Of the other sciences he had no profound knowledge, but the utmost faith and hope in their power to benefit man. He was somewhat ingenious, and devised the safety rerailing frog for bridges, known by his name, and which has saved many lives as well as many trains and many bridges. He was the first to summon his track supervisors to regular discussions and to publish their transactions, demonstrating how much they could be stimulated and benefited by these conferences. He was a pretty good French scholar, although he believed all French philosophy and the metric system to be direct emanations from the devil.

But the basis of his character was his love of right, and his plain purpose never to do, nor to permit to be done, anything that was wrong. He saw clearly and believed firmly that to do wrong could never result in benefit to him nor to the corporation he, for the time, represented. Where he was known, the confidence in his perfect integrity was so great that he became the most successful of negotiators, his simple directness being more than a match for another's smartness or cunning. He was without fear of any man, or of his position, or of his influence, so that his judgment was never warped by his superior's purpose to get the better end of a bargain. He stood always for what was fair and equal, and he was utterly disinterested. At the same time he was devoted to the corporation which he served with an intense enthusiasm into which a thought of himself did not enter.

Aside and apart from his daily life of care for material interests, he was another and peculiar person. He firmly believed in the divining-rod and that it would reveal the secrets of the earth; he wrote a treatise upon it. He finally came to believe in his own susceptibility to impressions from below, so that he confidently asserted the presence or absence of coal, oil, metals, etc., at certain depths, which his senses alone determined, without the use of the rod; but which the rod or exploration would confirm.

He adopted the views of the believers in the divine origin of the great pyramid, of its prophecies and of its important lessons for mankind; consequently, in the sacred character of the British inch and other measures of capacity. He was instrumental in founding the society for the preservation of those weights and measures; edited and published a magazine for the propagation of the views of that society, becoming responsible for the expenses attending its publication. He believed in the Cabala, in the Second Advent as already here, and that the United States is the New Jerusalem. These extravagances of opinion, as they were considered by the mass of men, were generally unfavorable to his reputation as an engineer and as a man of business; although to those who knew him well they seemed not to affect his judgment or conduct of affairs. But he failed to observe the maxim of Pythagoras, "Speak not of God to every man," and made no secret of his private beliefs. So he died poor, probably leaving no provision for his three orphans.

To worship God, to love man, to fear none, to help all, to do no wrong, to advocate justice and peace, to live simply, to walk humbly, to promote virtue—these were the aims and the distinguishing characteristics which made those who knew Charles Latimer to love and venerate him during his life and now to deplore his departure from the earth.

ELECTIONS AND APPOINTMENTS.

Atlanta & Charlotte Air Line.—The following directors were re-elected at the annual meeting: Eugene Kelly, Richard Irvin, Jr., James G. Grannis, J. Henry Williams, R. A. Lancaster, J. Wilcox Brown, W. N. Wilmer, P. P. Dickinson, B. R. McAlpine, James H. Young, H. W. Sibley and Skipwith Wilmer.

Central Washington.—The following officers of this Northern Pacific enterprise have been elected: President, J. M. Buckley; Vice-President, C. B. Cole, Tacoma, W. T.; Treasurer, George S. Baxter, of St. Paul, Minn.; Chief Engineer, H. S. Huson; Auditor, J. A. Barker; Secretary, Newman Kline.

Chicago, Lodi & Southeastern.—J. J. Shafer has been elected President of this projected road, vice T. N. Rice, resigned.

Chicago, Madison & Northern.—The directors of the consolidated company are Stuyvesant Fish, B. F. Ayer, E. H. Harriman, E. T. Jeffreys and John C. Welling. James I. Neff is President and Bernt Moe Secretary of the company. The principle office will be in Chicago.

Chicago, St. Louis & Pittsburgh.—The following directors were re-elected at the annual meeting held in Indianapolis, March 21: G. B. Roberts, J. N. McCullough and William Thaw.

Chicago & Western Illinois.—The incorporators and first board of directors of this new Illinois company are: Henry A. Gardner, Edward F. Lawrence, Robert D. McFadden and William A. Lamson, of Chicago, and Charles W. Bunn, of St. Paul.

Cumberland Gap & Mississippi Valley.—The projectors of this Kentucky company are J. F. Foard, E. P. Campbell, S. J. Keith, J. D. Russell, W. M. Duncan, Lucien Jones, Wm. Morrow, H. H. Aberrathy, C. E. Hoge, C. F. Jarrett, H. P. Mason, J. I. Lardes and Hunter Wood.

Durham & Northern.—The following are the officers of this company: John C. Winder, President, Raleigh, N. C.; C. H. Scott, Chief Engineer, Henderson, N. C.; W. W. Vass, Treasurer, Raleigh, N. C.

Fitchburg.—J. W. Burnham has been appointed Car Accountant, with office at Boston, Mass., vice I. W. Mackie, resigned.

Florida Southern.—The following directors have been elected: John W. Candler, Jacob Edwards, Asa P. Potter, Rufus H. Brown, John R. Hall, William L. Candler, Frank Q. Brown, Edward Avery, J. Wentworth Brown.

Fort Smith, Paris & Dardanelle.—The following are the officers of this Arkansas company: Thomas Boles, President; J. H. Carnall, Secretary; C. R. Jones, Treasurer. The general office is at Fort Smith.

Housatonic.—Walter B. Keeler has been appointed General Freight Accountant, with offices at Bridgeport, Conn.

Kansas City, Monett & Southern.—The directors of this Kansas company are: F. E. Doubleday, W. E. Seymour and D. Ramsey, of Crawford County, Kan.; R. C. Kerens, C. H. Smith, B. F. Hobart and E. B. Loveland, of St. Louis; Logan H. Roots, Little Rock, Ark.; Hon. Powell Clayton, Eureka Springs, Ark.; Stephen B. Elkins, New York City, and George T. Sparks, Fort Smith, Ark.

Kentucky Central.—The following directors have been elected: I. E. Yates, Calvin S. Brice, George Bliss and Samuel Thomas, of New York; Elliott H. Pendleton and M. E. Ingalls, of Cincinnati, and H. E. Huntington, of Covington, Ky.

Little Rock & Alexandria.—The following are the officers of this company: President, S. M. Markle, St. Joseph, Mo.; Vice-President, B. W. Johnson, Camden, Ark.; Treasurer, William Farrell; Secretary, John B. Jones; Chief Engineer, John A. Martin, Little Rock, Ark.

Louisville, St. Louis & Texas.—John Saurple has been appointed Chief Engineer.

Mexican Central.—Andrew Smith has been appointed Superintendent of the First Division.

Missouri Pacific.—Thomas Humes has been appointed Division Superintendent, with headquarters at San Antonio, Tex.

Mobile & Ohio.—D. McLaren, Superintendent of the Mobile Division, will assume charge and control of the operations of the Mobile & Ohio from Mobile to East Cairo April 1. J. N. Seale will be located at Jackson, Tenn., as Assistant Superintendent.

National Association of General Passenger & Ticket Agents.—At the meeting held in St. Augustine, Fla., the following officers were elected: President, James L. Taylor (Richmond & Danville); Vice-President, Henry Monett (New York Central & Hudson River); Secretary, A. J. Smith (Lake Shore & Michigan Southern). The following executive Committee was elected: B. W. Wrenn (East Tennessee, Virginia & Georgia), F. Chandler (Wabash Western), James Barker (Wisconsin Central).

New Orleans, Natchez & Fort Scott.—John N. Rice, Fort Scott, Kan., is President of this company, and James W. Lambert, Natchez, Miss., is Secretary.

Pennsylvania.—At the annual election in Philadelphia this week the following directors were elected: George B. Roberts, Wistar Morris, Alexander M. Fox, Alexander Biddle, N. Parker Shortridge, Henry D. Welsh, John Price Wetherill, William L. Elkins, William Thaw, H. H. Houston, A. J. Cassatt, C. A. Griscom, B. B. Comegys. The number of shares voted on was 638,476.

Pittsburgh, Shenango & Lake Erie.—A. H. Steele has been chosen First Vice-President, with office in New York.

Rockaway Valley.—The following are the officers of this company: President, J. N. Pidcock; Vice-President, W. W. Sutton; Treasurer, Robert Craig; Secretary, J. R. Fisher; Chief Engineer, J. E. V. Melick.

St. John & Lake Eustis.—The following directors have been elected: Jacob Edwards, John W. Candler, E. Avery, Asa P. Potter, R. H. Brown.

St. Louis, Iron Mountain & Southern.—The directors have elected the following officers: President, Jay Gould; First Vice-President, S. H. H. Clark; Second Vice-President, A. L. Hopkins; Third Vice-President, George J. Gould; Secretary and Treasurer, A. H. Calef; Local Treasurer, D. S. H. Smith; Assistant Secretary, S. D. Burlow; Second Assistant Secretary, Guy Phillips.

San Diego, Cuyamaca & Eastern.—The directors of this California company for the first year are R. W. Waterman, R. Allison, Milton Santee, William E. High, I. M. Merrill, G. W. Jorres and M. Klauber.

Selina & Cahaba Valley.—The officers are as follows: E. G. Gregory, President; J. W. Moore, Vice-President; L. H. Montgomery, Secretary; A. W. Cawthon, Treasurer. E. S. Starr, Selma, Ala., is Chairman of the Executive Committee.

Shade Creek.—The following are the directors of this Pennsylvania Company: S. H. Baker, President, Pittsburgh, Pa.; James M. Coover, Jenner Crossroads, Somerset Co., Pa.; Frank Taylor, A. W. Oxnard, John Murdock, J. M. Murdock, Johnstown, Cambria Co.; Edward Pitcairn, Derry Station, Pa.

Southern Pacific.—Thomas J. Urquhart has been appointed Division Superintendent of the Ventura and Los Angeles divisions, with headquarters at Mojave, Cal.

Texas, Sabine Valley & Northwestern.—The following are now the officers of this company: N. S. Easton, New York, President; R. J. Evans, Longview, Tex., Vice-President and General Manager; E. S. Larchar, New York, Secretary and Treasurer; F. M. Larchar, New York, Auditor.

Tilton & Belmont.—The officers of this New Hampshire company are as follows: President, C. E. Tilton, Tilton; Secretary, Edwin C. Bean, Belmont; Treasurer, C. C. Rogers, Tilton.

Tuscaloosa Northern.—The following are the officers of this company: H. H. Peck, President; W. C. Jemison, Vice-President; G. A. Searcy, Treasurer; G. P. Ayres, Secretary; R. C. McCalla, Chief-Engineer. The general office is at Tuscaloosa, Ala.

Western New York & Pennsylvania.—The following directors were elected at the adjourned meeting held in Philadelphia this week: Calvin H. Allen, Edward L. Owen, Samuel G. DeCoursey, George E. Bartol, Adolph Engler, James Rawle, William T. Tiers, Isaac N. Seligman, E. W. Clark, Jr., Gustav E. Kissel, John D. Probst, Carl Schurz and Arnold Marcus.

Wisconsin Midland.—The following are the officers of this company: C. H. Benton, Acting President; G. A. Knopp Treasurer; Dano C. Lamb, Secretary; N. Boardman, Consulting Engineer. The general offices are at Fond du Lac, Wis.

OLD AND NEW ROADS.

New Companies Organized.—Bismarck & Missouri Valley; Chicago & Western Illinois; Kansas City, Monett & Southern; Shade Creek.

Alabama Great Southern.—A four-mile branch to the coal lands near Trussville, Jefferson County, Ala., will soon be built.

Baltimore & Ohio.—The agreement of last August with the Drexel-Morgan syndicate by which the syndicate was to furnish ten million dollars, taking five million in bonds and five million in preferred stock has been modified, Baltimore stockholders having objected strenuously to the issue of preferred stock. Instead of this the syndicate will now take 2½ millions in bonds of the consolidated mortgage. The total amount furnished seems therefore to be only 7½ millions.

Batesville & Brinkley.—The gauge of the road will be changed from 3 ft. to standard. It is a 60-mile road extending from Brinkley, Ark., to Jacksonport. R. W. Martin, Little Rock, Ark., is President.

Belmont & Tilton.—Work will probably be commenced on this New Hampshire road the latter part of spring. It is to be built by the Concord, from Tilton to Belmont, about 5 miles.

Birmingham Mineral.—This road is projected in the interest of the Louisville & Nashville from Birmingham, Ala., about 80 miles, north to Huntsville, with several short branches. The location is nearly completed and the road will probably be completed by July 1. J. W. Worthington & Co., Birmingham, Ala., have the contract to construct 27 miles of the road.

Bismarck & Missouri Valley.—Charter filed in Dakota to construct a road from Sioux City, Ia., northwest to Coal Harbor, McLean County, Dak., a point about 50 miles north of Bismarck.

Canadian Pacific.—The statement that the projected lines in New Brunswick and Nova Scotia would be abandoned is denied by the president of the company.

Central of New Jersey.—A contract has been made with the United States Express Co. to run for five years from May 1, by which the express company will secure the entire express business of the road with the exception of the through traffic between New York and Philadelphia, which is handled by the Adams and Baltimore & Ohio companies.

Central Pacific.—Senator Stanford appeared this week before the Special Senate Committee, to which was referred the report of the Pacific Commission.

Chicago, Kansas & Nebraska.—The company has been voted a subsidy of $60,000 by Thomas County, Kan.

Chicago, Madison & Northern.—The Freeport Dodgeville & Northern has consolidated with this company. They are branches of the Illinois Central.

Chicago, Milwaukee & St. Paul.—A corps of engineers is making a survey from Lanark, Ill., north to Warren, in Jo Daviess County, on the Chicago & Northwestern, a distance of 25 miles. It is supposed to be for an extension of this road.

Chicago, Rock Island & Colorado.—A meeting will be held in Denver, Col., April 30, to consider an agreement between the company and the Denver & Rio Grande for the joint use of the track of the latter between Denver and South Pueblo.

Chicago & Western Illinois.—Incorporated in Illinois to construct a road from Byron, Ogle County, on the Chicago, St. Paul & Kansas City, south to Streator; also from Sycamore southwest to Keithsburg, both on the Chicago, St. Paul & Kansas City. The capital stock is $3,000,000. It is thought it is a Chicago, St. Paul & Kansas City project.

Cumberland Gap & Mississippi Valley.—A bill has been introduced in the Kentucky Legislature to charter this company to build a railroad from a point in Kentucky on the Mississippi River through Mayfield, Graves County, and Hopkinsville to Cumberland Gap, on the Tennessee River.

Dayton, Fort Wayne & Chicago.—Receiver Marshall is stated to have decided to purchase 4,000 tons of new steel rails, 75,000 new ties, 250 coal cars, 6 locomotives, a steam shovel and a ballast unloader. He will build a number of new bridges and trestles.

Deer Creek & Susquehanna.—A survey will soon be made for the road from Bel Air, Harford County, Md., on the Maryland Central, to the Susquehanna River.

Denver, Garden City & Southeastern.—It is stated that the contract has been let for constructing a road from Dodge City, Kan., west to Garden City, a distance of about 50 miles. It is supposed to be an extension of the Chicago, Kansas & Nebraska.

Duluth, South Shore & Atlantic.—The land grant bondholders of the Detroit, Mackinac & Marquette have received 35 per cent. of common stock of this company, in accordance with an agreement made when the road was purchased by the Duluth, South Shore & Atlantic.

A five-mile branch will be built early in summer to Portage Entry, near Houghton, Mich.

Erie & Central New York.—The New York Assembly has passed the bill extending the charter for five years. The bill also authorizes the company to change its route so as to run through the towns of Lisle, Nanticoke and Main in Broome County, connecting at Union with the New York, Lake Erie & Western.

Fort Smith, Paris & Dardanelle.—The contracts will be let about the middle of April for the construction of this road, which is to extend from Fort Smith, Ark., east to Dardanelle, about 80 miles. It is hoped to have it completed by Jan. 1, 1889.

Georgia, Carolina & Northern.—That part of the road between Monroe and Chester, S. C., 50 miles, has been nearly all graded, and the contracts for the divisions west of Chester will probably soon be let.

Helena, Boulder Valley & Butte City.—The engineers are now making the location for the extension of this branch of the Northern Pacific to Butte City, Mont.

Jeanerette, Abbeville & Western.—It is expected that the company will commence work on its road about June. It is projected to extend from a point about five miles west of Jeanerette, La., to Abbeville, a distance of 25 miles. F. M. Welch, Jeanerette, La., is President.

Illinois Central.—It is reported that engineers said to be in the employ of this company are surveying a route to Deadwood, in the Dakota Black Hills.

Indianapolis & Vincennes.—The company will build a five-mile branch from Spencer, Ind., east to Stinesville, Owen County, on the Louisville, New Albany & Chicago. It is stated that it may also build a line from there south to Bloomington, about 10 miles, which would parallel the Louisville, New Albany & Chicago.

Kansas City, Monett & Southern.—Incorporated in Kansas to build a road from Kansas City, Kan., southerly through the counties of Wyandotte, Johnson, Miami, Linn, Bourbon and Crawford in Kansas, and the counties of Jackson, Cass, Bates, Vernon, St. Clair, Cedar, Barton, Dade, and Lawrence, to Monett in Barry County on the St. Louis & San Francisco in Missouri, the estimated length of the road being 270 miles. The capital stock is $5,000,000. The headquarters of the company are to be at Kansas City, Kan.

Kansas City & Rich Hill.—The contract for 44 miles has been let to Garland & Seldon, Kansas City, Mo., who will complete the road ready for operation. Work will commence as soon as the weather permits. As at present projected the road extends from Blue Springs, Jackson County, Mo., through Pleasant Hill and East Lynne to Rich Hill, Bates County, Mo., a distance of 70 miles. It will give access to new coal fields. John C. Oliphant, Rich Hill, Mo., is chief engineer.

Little Rock & Arkansas.—The contracts for this road will be let in about two or three months. It is to extend from Little Rock, Ark., almost directly south to Alexandria, La., where it will connect with the Texas & Pacific and Southern Pacific. The officers are given in another column.

Lookout Mountain.—The first section of this standard gauge road up Lookout Mountain has been completed, and the first train went over it March 25. The entire road will be completed May 15.

Lynchburg & Durham.—Bids are asked for grading, trestling, etc., 24 miles of road south from Rustburgh, Va., near Lynchburg, and 10 miles north from Durham, N. C., a bridge will be erected over the Staunton River. J. W. Goodwin, Lynchburg, Va., is Chief Engineer.

Mexican National.—The heavy tunneling, etc., has been completed for 50 miles beyond Saltillo, and the track laid. Work is now progressing at the rate of about 1½ miles per day.

Mexico.—A road is projected from Monterey via Victoria to Tampico or Soto de la Marina, giving the Mexican National an outlet in Mexico upon the Gulf. Another project looking to a Gulf connection is that of the railroad from Nuevo Laredo to Matamoras, which is now asserted will be built within 18 months.

It is stated that a road will be built from Jimenez, on the Mexican Central, southwest to Balleza, and then possibly to the Gulf of California, and that German capitalists are backing the scheme.

Missouri, Kansas & Texas.—A large meeting was held in New York, March 26, of stock and bondholders who are dissatisfied with the present management, claiming that traffic has been systematically diverted to other lines controlled by the lessees, thus depriving the owners of this property of their fair income. A committee was appointed to solicit proxies with a view to changing the board of directors at the annual meeting in May. The committee consists of W. L. Bull, William Menetens, William E. Strong, J. J. De-Neufville, and R. D. Martensen.

Mobile, Hattiesburg & Jackson.—The survey for this road has been commenced. It is thought that the contracts will be let by November. The road is projected from Mobile, Ala., northwest to Jackson, Miss., about 175 miles, and it is said to be in the interest of the Cincinnati, New Orleans & Texas Pacific. O. F. Cawthorn, Mobile, Ala., is President.

Nantasket Beach.—The Old Colony has secured control of the road, and will soon place it in operation.

Nevada & California.—The company operates a line from Reno, Nev., northwest to Moran, Cal., 37 miles, and work is in progress on an extension north for 47 miles. Surveys are also being made for 30 miles further.

Tennessee & Coosa.—The right of way has been granted through Huntsville, Ala., for the extension from Gintersville. It is guaranteed that work will begin within four months.

New Roads.—The survey has been completed for a line from the Kentucky State Line to Cumberland Gap, to connect the Cincinnati Southern and East Tennessee, Virginia & Georgia.

A road is projected to extend from Hueneme, Cal., south to Los Angeles, through the Santa Susana Pass, a distance of about 63 miles. The road will probably be subsidized to the extent of about $400,000.

It is stated that a company will soon be organized to construct a standard gauge road from Nordhoff, Ventura County, Cal., to Santa Barbara, passing through Carpenteria and Montecito, about 40 miles.

A company has been organized in Aberdeen, Dak., by C. A. Bliss, H. M. Marple and others to construct a road from Aberdeen, southeast to Sioux Falls, a distance of about 200 miles.

A road is projected from Shelbyville, Ill., on the Indianapolis & St. Louis, northeast to Sullivan, about 16 miles, and possibly to Tuscola.

New York, Boston & Montreal.—Judge Wallace, in the United States Circuit Court at New York, has dismissed the complaints in the suits of the Banque Franco-Egyptienne of Paris and Henry Louis Bischoffsheim of London, against Jesse Seligman, W. H. Brown, and other trustees of the company. One of the suits has been in the courts since 1875 and the other since 1878, and were brought to recover from the company $6,000,000, the amount paid on the first mortgage bonds.

New York, Mahoning & Western.—Twenty miles of the grading have been completed by the contractors, Otis & Graham, of Norwalk, O. The road is being built from Youngstown, O., to Fort Wayne, Ind. E. R. Chapman is President.

New York, Pennsylvania & Ohio.—Drake & Stratton, of Pittsburgh, have received the contract to double-track the road between Cleveland, O., and Youngstown. Work will begin at both ends of the line early in April and will be completed by Nov. 1. Work on the new repair shops at Willson avenue, Cleveland, will also be commenced soon.

Northern Dakota & Pacific.—The company proposes to construct a road from Guelph to Cando, Towner County, Dak., on the St. Paul, Minneapolis & Manitoba. Crawford Livingstone, St. Paul, Minn., is one of the projectors.

Pennsylvania.—The company will this spring begin work on the ground for the proposed new freight yard near Wall station east of Pittsburgh, which is to be a very large one. Chief Engineer Brown asks for bids for the grading.

Philadelphia & Reading.—It is stated that the company has practically secured the right of way for the construction of an elevated railroad from Ninth and Green streets to Twelfth and Market streets, Philadelphia, and that the work of tearing down the purchased property will begin next month, and that the leases of the tenants have been bought and agreements signed to vacate on April 1. But one building, on the west side of Arch street, remains to be bought. The new addition to the road will be 70 ft. wide. The depot will be at Twelfth and Market streets.

Pittsburgh, Akron & Pittsburgh.—It is stated that work will probably be commenced on this road before the fall. It is projected to extend from Akron, O., west to Delphos, about 160 miles. Wm. A. Lynch, Canton, O., is interested.

Pleasant Hill & Winterville.—The survey has been completed for this road, and grading will probably commence in a week or two. The road is to extend from Pleasant Hill, Ga., to Winterville, a distance of about 10 miles. Col. J. M. Smith, Winterville, Ga., is President.

Richmond & Danville.—It is reported that the company is considering the advisability of an extension of the Elberton Air Line from Elberton, Ga., southeast about 25 miles to a connection with the Georgia road at Washington, Wilkes County.

Roanoke & Southern.—President John D. Spencer informs us that a reliable construction company could make a profitable contract with the road for building and equipping the line between Roanoke, Va., and Winston, N. C., 110 miles. The company has 200 convicts, and if the work is not let to a construction company by April 10 it will be done in sections by contract. Contractors can apply at once to President Spencer, Martinsville, Va.

Rocky Fork & Cooke City.—It is stated that this Montana Company will soon commence tracklaying on 46 miles of the road already graded. The location has been completed 70 miles further to Cooke City.

Rockaway Valley.—Work will soon begin on the first section of this road extending from White House, N. J., on the Central of New Jersey, toward New Germantown.

Rumford Falls & Buckfield.—A 10-mile branch northwest from Canton, Oxford County, Me., to Dixfield, is under consideration. W. L. Putnam, Portland, Me., is President.

San Antonio & Aransas Pass.—Arrangements have been made with the holders of the floating and equipment bonds to pay them with second mortgage bonds, which will be issued at the rate of $8,000 per mile of completed road, will run 40 years, bearing 5 per cent. interest from Jan. 1 next; but interest for five years will be payable only out of surplus income over operating expenses, interest on first mortgage and necessary expenditures for improvement.

An effort is being made to have the company extend its road northwest through Luling and Lockhart to Austin, Tex.

Savannah, Macon & Dublin.—It is reported that the division between Macon and Dublin will soon be completed under a separate charter. It is stated that the Central of Georgia has secured an interest in the road.

Seattle & Green Lake.—The survey for the road has been commenced. C. C. Calkins, Seattle, W. T., is interested.

Selma & Cahaba Valley.—The name of this road, which is to extend from Selma, Ala., north to Bessemer, about 80 miles, will be changed to Bessemer, Selma & Pensacola. The contract for constructing the road has been let to Pearson & Crocker, of New York, and will be operated in the interest of the Louisville & Nashville.

Shade Creek.—Incorporated in Pennsylvania to build a road about 12 miles in length, from a point near the mouth of Shade Creek, to Ogle Township, in Somerset County. The capital stock is $72,000. S. H. Baker, Pittsburgh, Pa., is President.

Sierra Madre, Norwalk & Coast Air Line.—The company proposes to construct a road from Norwalk, Cal., on the Southern Pacific, to Los Alamitos Bay.

Sinaloa & Durango.—The charter of the company has been amended so as to authorize the construction of a road from Mazatlan, Mexico, north to Guaymas, with the promise of a subsidy of $8,000 per kilometer ($12,875 per mile) payable in 6 per cent. bonds, which it is thought will be marketable at something less than 90. Guaymas is the southern terminus of the Sonora road, and if the road is built it will give a short route between San Francisco and the City of Mexico, by connecting with the western division of the Mexican Central (now being constructed) at San Blas, to which it will be necessary to build a short branch. The road has a charter to construct a line from Altata, on the Gulf of California, through Durango to the Rio Grande, and also from Mazatlan to Alamos, in the state of Sonora, but only 38 miles, between Altata to Culiacan, in Sinaloa, have been built.

Sioux City & Northern.—It is reported that the contracts for about 130 miles will be let early in April.

Spokane & Palouse.—Construction work has been resumed on this branch of the Northern Pacific, and the line will probably be completed to Genesee, Idaho, 114 miles south of Spokane Falls, Wash. T., by May 1. It is at present in operation between Spokane Falls and Belmont, 52 miles.

Tuscaloosa Northern.—The location is completed from Tuscaloosa north to Alta on the Georgia Pacific, a distance of about 35 miles. R. H. Squair & Co. have the contract from Tuscaloosa north to the Warrior River, seven miles. The northern terminus of the road has not yet been decided upon.

Washington & Idaho.—The United States Senate has passed the bill giving the company right of way through the Couer d'Alene Indian Reservation. T. R. Tannatt, Farmington, W. T., is one of the projectors.

Wheeling & Lake Erie.—The stockholders have voted to make the present capital stock preferred.

White & Black River Valley.—The engineers are surveying the line between Jacksonport, Ark., and Pocahontas. The road is projected to be built to a point near the Missouri state line, about 75 miles northeast of Jacksonport. Contracts will probably be let when the survey has been completed. The officers are the same as those of the Batesville & Brinkley, of which R. W. Martin, Little Rock, Ark., is President.

Wisconsin Midland.—The company proposes to build a road from Fond du Lac, Wis., north along the east shore of Lake Winnebago, then to Baraga or L'Aense, Mich., on Lake Superior, with a branch northeasterly from Fon-du Lac to Sturgeon Bay. An extension southwest to Madison, about 70 miles, is under consideration, and the survey for this branch will be commenced during April. The contracts will be let when the financial arrangements are completed.

TRAFFIC AND EARNINGS.

East-bound Shipments.

The east-bound through shipments of flour, grain, provisions, hides, wool and lumber from Chicago for the week ending March 24 amounted to 56,829 tons, against 55,852 tons during the preceding week, an increase of 977 tons, and against 74,486 tons during the corresponding week of 1887, a decrease of 17,657 tons.

Coal.

The coal tonnages for the week ending March 24 are reported as follows:

	1888.	1887.	Inc. or Dec.	P. c.
Anthracite	686,897	680,957	I. 5,940	0.9
Bituminous	260,777	308,702	D. 47,925	15.5

The Cumberland coal trade for the week ending March 24 amounted to 66,291 tons, and for the year to that date, 730,570 tons.

The coal and coke tonnages of the Pennsylvania road originating on the lines east of Pittsburgh and Erie, for the week ending March 24, and the year to that date, were as follows:

	Coal.	Coke.	Total.
Total week ending Mar. 24, 1888	228,017	66,338	294,355
Total year 1888 to date	2,681,343	896,976	3,578,319
Total year 1887 to date	2,377,302	1,024,718	3,402,020

On the United Railroads of New Jersey Division the anthracite tonnages for the same periods were as follows:

	1888.	1887.	Decrease.
Total for week	24,079	41 208	D. 17,219
Total for year	352 704	417,252	D. 64,548

Railroad Earnings.

The statement of earnings and expenses of the Norfolk & Western for February and the two months to Feb. 29 are as follows:

Month of February:	1888.	1887.	Increase.
Pass., mail and express	$63,410	$44,646	I. $18,764
Freight	287,358	254,686	I. 32,672
Total gross earnings	$350,768	$299 332	I. $51,436
Expenses, including taxes	222,009	172,675	I. 49,334
Net earnings	$128,758	$126,657	I. $2 100
Proportion of expenses to gross earnings	63 p. c.	58 p. c.	
Jan. 1 to Feb. 29.			
Pass., mail and express	$134,286	$91,548	I. $42,738
Freight	597,283	487,089	I. 110 194
Gross earnings	$731,569	$578,637	I $152,932
Expenses, including taxes	444,176	340,795	I. 94,381
Net earnings	$287,393	$228,842	I. $58,551
Proportion of expenses to gross earnings	60 p. c.	60 p. c.	

The comparative statement of the earnings and expenses of the Philadelphia & Reading for February is as follows:

	1888.	1887.
Gross earn. Phil. & Read	$1,100,357	$1,518,256
Net " " "	349,132	725,862
Gross earn. P. & R. C. & I. Co	$283,444	$1,118.021
Net " " " df.	125,475	5,544
Total both Co.'s	$1,389,801	$2 636,277
Net	223,657	731,407

The statement for February, 1888, as compared with the same month in 1877, shows:

A decrease in gross earnings of	$1,246,476
A decrease in expenses of	738,726
A decrease in net earnings of	$507,750

The statement for the three months ending Feb. 29, 1888, as compared with the same period in 1887, shows:

A decrease in gross earnings of	$2,222.140
A decrease in expenses of	992,727
A decrease in net earnings of	$1.2 9,413

The operations of the St. Paul & Duluth for the last two calendar years are as follows:

Year.	1887.	1886.	Inc. or Dec.
Earnings	$1,694.339	$1,558,086	I. $136,253
Expenses	1,172,259	927.295	I. 244 964
Net	$522,080	$630,791	D. $108,711
Land, etc	541,926	163,057	I. 378,869
Other income	24,852	24,142	I. 710
Total net	$1,088,858	$817,990	I. $270,868
Charges	104,051	101,147	I. 2,904
Balance	$984,807	$716,843	I. $267,964
*Dividends	496,114	374,766	I. 21 348
Surplus	$488,693	$342,077	I. $146,616

* No dividend in common in 1886.

Earnings of railroad lines for various periods are reported as follows:

Month of February:	1888.	1887.	Inc. or Dec.	P. c.
Cape F. & Y. Vy.	$27,984	$24,184	I. $3.800	15.7
Net	15,569	12.787	I. 2,782	21.8
C. R. R. & Bank Co. of Ga.	620,905	554,543	I. 66,362	12.0
Net	270.953	221,779	I. 49,174	22.2
Nash., C. & St. L.	248,835	249,461	D. 626	0.3
Net	102,300	113,436	D. 11,136	9.9
Norfolk & West.	350,768	299,332	I. 51,436	17.2
Net	128,758	126,657	I. 2,101	1.7
North. Central.	454,751	488,989	D. 34,238	7.0
Net	147,571	196.167	D. 48,596	24.8
Phila. & Read	1,106,357	1,518,256	D. 411,899	27.1
Net	349,132	725,862	D. 376,730	51.9
Phil. & R. C. & I.	283,444	1,118.021	D. 834,577	74.5
Net	Def. 125,475	5,545	D. 131,020	....
Total both Cos	1,389,801	2,636,277	D. 1,246,476	47 2
Net	223,657	731,407	D. 507,750	69.6
Rich. & Danv.	429,705	363,461	I. 66,244	18.3
Net	230,188	194,870	I. 35,318	18 1
Va. Mid. Div.	129,914	103.720	I. 26,194	25 2
Net	45,208	27,822	I. 17,386	62,5
Char., C. & A.	92,359	79,630	I. 12,729	15.9
Net	46,870	44.975	I. 1,895	4.2
Col. & Gr. Div.	69,829	66,873	I. 2,956	4.4
Net	36,316	37.163	D. 847	2.3
West. N. C. Div	56,891	49,537	I. 7,354	14.9
Net	17,358	10,337	I. 7,021	68.2
To. R. & W. P. Ter. system	763,339	658,447	I. 104,892	15.9
Net	336.560	294,803	I. 41.757	14.2
Summit Branch	121,719	88.079	I. 33.640	38.2
Net	18,500	4,576	I. 13.924	304.0
*Lykens Valley	94,773	39,935	I. 54,838	137.4
Net	2,443	Def. 16,139	I. 18,582	....
West. N. Y. & P.	215,564	184,148	I. 31,416	17.1
Net	46,223	218	I. 46,005	....
Total (gross)	$5,067,137	$5 886.616	D. $819,479	16.2
Total (net)	1,668,474	2,000,858	D. 568,329	28.4
			I. 235,945	....
Net			D. 332,384	16.1
Month of January:				
Chi., Bur. & No.	108,835	155.656	D. 46,821	30.0
Net	Def. 7,552	13.069	D. 20,321	....
Eliz., Lex. & B. S.	87,800	76,651	I. 11,149	14.5
Net	24,090	22.926	I. 1,164	5.0
Lake E. & W	145,407	152.847	D. 7.440	4.8
Net	43,789	32,377	I. 11.412	35.2
L., N. A. & Chi.	147,057	139,417	I. 7,640	5.5
Net	26,379	15,555	I. 10.824	69.4
Min., S. S. & A.	30.457	10,147	I. 20,310	201.1
Net	Det. 11.230	2.042	D. 13,272	....
Ohio River	26,984	18,404	I. 8,580	47.6
Net	9,676	7,625	I. 2,051	26.9
Oreg Imp. Co	342.879	263.351	I. 79,528	30.2
Net	38,908	25,171	I. 13.737	54.9
Wabash	456,114	483,549	D. 27,435	5.7
Net	68,359	152,887	D. 84,528	55.2
Total (gross)	$1,345.593	$1,300,022	I. $45,571	3.5
Total (net)	192,719	271,652	D. 118,121	43.4
			I. 39,188	....
Net			I. $78,933	29.0

Month of December:					
A., T. & St. Fe	1,495,954	1,524,929	D.	28,975	1.9
Net	675,839	753,151	D.	77,312	10.3
Southern Pac. Co.:					
No. Div. (Cal.)	137,082	148,188	D.	11,106	7 5
Net	51,263	66,315	D.	15,052	22.7
Arizona Div	234,704	129,545	I.	105,159	80 9
Net	98,252	39,680	I.	58,572	147.5
New Mex. Div.	99,937	59,213	I	40.724	69.0
Net	47,793	22,267	I.	25,526	114.5
Two months—Jan. 1 to Feb. 29:					
Cape F. & Y. V	55,904	44,897	I.	11,007	24.4
Net	30,976	23,101	I.	7,875	34.2
C. R. R. & Bank. Co. of Ga	1,289.903	1,077,234	I.	212.669	19.7
Net	505.012	369,313	I.	135,699	36 8
Nash., C. & St. L.	519,641	491,555	I.	28,086	5.7
Net	214,969	218,403	D.	3,434	1.6
Norfolk & West.	731,569	578,638	I.	152,931	26.4
Net	287,393	228 842	I.	58,551	25 6
North. Central	907,192	1,003,937	D.	96 745	9.7
Net	275,818	426,391	D.	150,573	35.3
Rich. & Danville.	819,464	704,500	I.	114,964	16.3
Net	408,821	362,664	I.	46,157	12.7
Virginia Midl.	255,746	214,001	I.	41.745	19.5
Net	88,192	64,007	I.	24.185	37.8
Char., Col. & A.	176,616	148,206	I.	28,410	19.2
Net	88,392	81,151	I.	7,241	8.9
Col. & Gr. Div.	127,693	111,256	I.	16,437	14.9
Net	65,293	52,496	I.	12,797	24.2
W. N. Car. Div.	107,565	99,486	I.	8,079	8.2
Net	17,249	21,919	D.	4,670	21.3
To. R. & W. P. Ter. system	1,478,735	1,280,202	I.	198,533	15.9
Net	631,652	564,206	I	67.446	11.9
Summit Branch	278,692	174,390	I.	104,302	60.0
Net	49,451	2,982	I.	46,469	....
*Lykens Valley	194,115	86,859	I.	107,256	123.4
Net	Def 5,421	Def. 31,373	I.	25,951	....
W. N. Y. & Pa	428 323	373,957	I.	54,366	14.5
Net	92,853	Det. 30,735	I.	123,591	....
Total (gross)	$7,371,158	$6,389,118	I.	$982,040	15.3
Total (net)	2,750,663	2,353,368	I	555,962	23.6
			D.	158,677	....
Net			I.	$397.285	16.9
Two months—Jan. 1 to Feb. 29:					
Jan. actual, Feb. estimated:					
†Ill. C. (I. & S. Div.)	1,838,191	1,793,454	I.	44,837	2.5
Ced. F. & M	12,240	14,832	D.	2,592	17.5
Dub. & Sioux C.	129,726	114,035	I.	15,691	13.8
I. F. & S. City.	110,746	92,580	I.	18,166	19.6
Two months—Dec. 1 to Jan. 31:					
	1887-8.	1886-7.			
Ore. Imp. Co	714,084	527.821	I.	186,263	35.3
Net	114,679	69,661	I.	45,018	64.3
Five months—Oct. 1 to Feb. 29:					
Rich. & Danville.	2,227.893	1,928,756	I.	299,137	15 5
Net	1,146,178	963,386	I.	182,812	19.0
Vir Mid. Div.	717,728	643,653	I.	74,075	11.5
Net	300,986	229,858	I.	71,128	30 9
Char., Col. & A.	465,354	392,643	I.	72,711	18.5
Net	250 625	207,158	I.	43,467	21.0
Col. & Gr. Div.	327,512	307 609	I.	19,903	6.5
Net	152,657	145,387	I.	7.270	5.0
W. N. Car. Div.	272,946	242,685	I.	30,261	12.5
Net	44,061	40,527	I.	3,534	8.7
To. R. & W. P. Ter. system	4,003,302	3,517,659	I.	486,243	13.8
Net	1,833,062	1,549,029	I.	284,033	18.3
W. N. Y. & Pa	1,159,082	1,004,818	I.	154,264	15.4
Net	252,562	9,510	I.	243,052	....
Six months—Sept. 1 to Feb. 29:					
C. R. R. & Bank Co. of Ga	4,410,756	3,803,248	I.	607,508	16 0
Net	1,950,713	1,640,755	I.	309,958	18.9
Eight months—July 1 to Feb. 29:					
Nash., C. & St. L.	2 121,279	1,811,524	I.	309,755	17.2
Net	934,160	772,016	I.	162,144	21.1
Eleven months—April 1 to Feb. 29:					
Cape F. & Y. V	264,699	213,275	I.	51,424	24 1
Net	130,574	100,828	I.	29,746	29.6
Year to Dec. 31:					
Atch., T. & S. F.	18,461,366	15,984,307	I.	2,477,059	15.5
Net	8,604,075	7,863,351	I.	740,724	9.4
Southern Pacific:					
No. Div. (Cal.)	1,727.245	1,649,826	I.	77,119	4.7
Net	782,445	811,967	D.	29,522	3.6
Arizona Div	1,756,519	1,525,321	I.	231,198	15.1
Net	702,787	647.591	I.	55,196	8.5
New Mex. Div	735,736	667,196	I.	68,540	10.3
Net	313,409	310,131	I.	3,278	1.1

* Covers only coal and mining operations.

† The earnings of this system for 1888 were incorrectly given last week.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Cotton.

The cotton movement for the week ending March 23 is reported as follows, in bales:

Interior markets:	1888.	1887.	Inc. or Dec.	P. c.
Receipts	20,532	29.810	D. 9,278	31.1
Shipments	28,442	56,878	D. 28,436	49 9
Stock	276,960	173,846	I. 103,114	59.3
Seaports:				
Receipts	38,380	46,298	D. 7 918	17.1
Exports	63,048	109,887	D. 45,939	41.8
Stock	740,700	578,309	I. 162,391	28.1

Inter-state Commerce Commission.

On March 22 the Commission held a hearing in Lincoln, Neb., on the complaint of the Board of Trade of that city concerning rates on sugar and other articles from the Pacific coast, which are higher than rates on the same goods to Omaha. J. C. Stubbs, General Traffic Manager of the Southern Pacific, testified at length concerning transcontinental traffic. He began with a history of the sugar traffic. The Hawaiian Islands send to California 60,000 tons annually in excess of the local demand. The Central Pacific was told that if would carry this sugar to the Missouri River at 50 cents it could have the business, otherwise it would go around by water. When this traffic began 60 per cent. of the road's business was west bound, so that empty cars were constantly moving eastward, hence the sugar was accepted at 50c. On readjustment of the tariff, after the passage of the Inter-state Commerce law, much of it went to New York by water. Statistics from the San Francisco Custom House were given showing the amount of sugar sent by the Canadian Pacific. In May, 1887, when the fourth section of the law was suspended, the rate to Omaha was made 75c., but did not take the business. It was then reduced to 60c. and the Cadadian Pacific gave up the traffic. Since the organization of a sugar trust the California sugar men prefer to send their raw product to the eastern refineries. The road had refused to take sugar to New Orleans or St. Louis at 40c. Mr. Spreckels offers heavy consignments if the road will take them at 50c. to the Missouri River. The tea trade which formerly came to San Francisco has been diverted to the Canadian Pacific. The present freight tariff from the Pacific coast to the Missouri River is but little above the cost of operating. Of these rates the Southern Pacific proportion is 46 per cent. On green fruits the rates to Omaha and to Lincoln are the same, because there is no Canadian Pacific competition.

Witnesses for other roads testified, but covered few points not already shown in Mr. Stubbs' testimony. E. P. Ripley, of the Chicago, Burlington & Quincy, said that he had taken a little sugar from the Canadian Pacific at St. Paul and carried it to Omaha for 9c. per 100 lbs. but had stopped the traffic because it was unprofitable. He went out of the Pacific coast business voluntarily and not as the result of any arrangement with the Union Pacific.

Traffic Notes

It is reported that the committee which has been engaged in the attempt to consolidate the Trunk line freight classification with those used west of Chicago and by the transcontinental roads, has completed its labors at Chicago, but that the result of their work will not be reported to the roads until after a meeting in New York April 17. The consolidated classification has eight classes.

The Chicago & Atlantic has been allowed a differential on dressed beef from Chicago to New York of 10 cents. The rates now stand: Chicago to New York, regular rates, 65; rates via Chicago & Atlantic and Chicago & Grand Trunk, 55; to Boston by the latter, 50.

Ocean rates are now very low and are reported the same from Philadelphia and Baltimore as from New York. It is said that the Pennsylvania and Baltimore & Ohio railroads have taken a large share of the export traffic to Baltimore and Philadelphia during the past week or two.

Western Rates.

Most of the roads put in force their restored freight tariffs on Monday, March 26. There are several circumstances, however, which indicate that the restoration will not be very stable or longlived. The Wabash Western gives notice that it will probably reduce live stock rates from Kansas City in order to compete with those roads which furnish special cars for this traffic. The road is determined to have a share of the traffic, and will make reductions if necessary. The Chicago, Burlington & Northern, which has announced a restoration for April 5, insists that through rates between the seaboard and St. Paul shall be reduced from the former standard; that a through rate be made between the two points, as is done by the Sault Ste. Marie line, and that roads west of Chicago pro-rate with those east thereof on a mileage basis. At last accounts the Chicago, Burlington & Quincy seemed likely to postpone the restoration of its freight tariff, which it had announced would take place April 1.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette:*

Baltimore & Ohio	48	Norfolk & Western	98
Buffalo, Rochester & Pittsburg	64	Northern Central	132
Chicago & Alton	148	Richmond & Danville	64
Delaware, Lack. & Western	148	Rome, Watertown & Ogdens	16
Fitchburg	32	St. Louis, Vandalia & T. Haute	64
Lehigh Valley	98	Wrightsville & Tennille	23

Cleveland, Columbus, Cincinnati & Indianapolis.

This company reports for the year ending Dec. 31, 1887. The report is very minute and full, and the data are given separately for the C., C., C. & I., the Cincinnati & Springfield and the Indianapolis & St. Louis. In the abstract given below all figures are for the entire system. The total mileage owned and operated was 738.5 miles. The equipment was 228 locomotives, 167 passenger, and 7,225 freight cars. The general balance sheet condeused was as follows:

Assets.	
Road and equipment	$19,535,049
Material on hand	197,577
Securities, notes and other property	9,871,485
Cash and cash assets	1,167,348
	$30,771,459
Liabilities.	
Capital stock	$14,991,600
Bonded debt	10,460,000
Current liabilities	683,375
Balance, credit of income account	4 636,484
	$30,771,459

The income account was:

Net earnings as below	$997.986
Less attorney's fees, etc	24,500
	$973,486
Balance from 1886	4,400,491
	$5,373,978
Charged to income account for depreciation in equipment to Jan. 1, 1887	737,494
Balance to income account	$4,636,484

The earnings were:

	1887.	1886.	Inc. or Dec.	P. c.
Freight	$5,417,941	$4,841,782	I. $576,159	11.88
Passenger	2,006 238	1,724,035	I. 282.2 22	15.78
Mail	152,374	155,566	D. 3,192	2.05
Express	172,037	165,889	I. 6,148	3.71
Rents	116,392	98,609	I. 17,783	18.03
Int. and dividends	191,027	205,055	D. 14 028	6 84
Total earnings	$8,056,008	$7,190.936	I. $865,072	12 02
Operating expenses	5.235,730	4,757,789	I. 477,941	10.04
Operating cost	64.99 p.c.	66.16 p.c.	D. 1.17 p.c.	1.77
Net earnings	$2,820,278	$2,433.147	I. $387.131	15.91
Taxes	194.299	207.234	D. 12,935	6.24
Interest on bonds	1,056 245	1,058.380	D. 2,135	0.20
Rentals	644,858	630,643	I. 14,215	2.25
Iqt. and exchange	127,875	151,645	D. 23,770	15.67
Total taxes, interest on bonds, etc	$2,023,277	$2,047,902	D. $24,625	1.20
Balance	$797,001	$385,245	I. $411,756	106.88
Additions and betterments	431,522	314,580	I. 116,942	37.17
Balance	$365,480	$70,665	I. $294,815	417.19

Some traffic statistics are:

	1887.	1886	Inc.	P. c.
Tons	5,895,924	5,422,673	473,251	8.73
Ton-miles	727,813,936	667,582,584	60,231 352	9.02
Rate per ton-mile	.744 ct.	.725 ct.	.019 ct.	2.62
Cost per ton-mile	.511 ct.	.492 ct.	.019 ct.	3.86
Profit per ton-mile	233 ct.	.233 ct.	.....	....

	1887.	1886.	Inc or Dec.	P. c.
Passengers	$2,740.962	$2,512 687	I. $228 275	9 09
Passenger-miles	91,778,118	82,861 467	I. 8,916 651	10.76
Rate per pass.-mile	2.186 cts.	2.081 cts.	I. .105 ct.	5.04
Cost per pass.-mile	1,655 cts.	1.774 cts.	D. .119 ct.	6.71
Profit per pass.-mile	.531 ct.	.307 ct.	I. .224 ct.	72.96